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- a. Profile of cephalothorax.
 - b. Underside of cephalothorax.
 - c. Fore right view of eyes and falces.
 - d. Extremity of tarsus.
 - e. Natural length of Spider.
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 - b. Underside of cephalothorax.
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November 15, 1870.

Professor Flower, F.R.S., V.P., in the Chair.

Mr. Sclater exhibited a specimen of the new Australian Mud-fish, recently described in the Society's 'Proceedings' (1870, p. 222) by Mr. Gerard Krefft, C.M.Z.S., under the name of *Ceratodus forsteri*. For this valuable specimen Mr. Sclater was indebted to the kindness of Mr. E. P. Ramsay, of Dobroyde, N. S. W. The fish had been procured by Mr. Ramsay's agent in Queensland from a branch of the Mary River, on Eootaley Station, having been captured by hook and line by some blacks in the employ of Mr. D. Helsham. In letters to Mr. Sclater, Mr. Ramsay stated that he had made arrangements to have a large water-hole in the same neighbourhood dragged, and was therefore expecting a further supply of specimens, which he hoped to be able to forward, along with some remarks upon the habits of this fish, at an early opportunity.

Dr. J. Murie read a memoir on the form and structure of the

Manatee (*Manatus americanus*), as deduced from a fresh specimen of this animal forwarded to this Society in a living state by Mr. G. W. Latimer, of Porto Rico, C.M.Z.S., in April 1866, but which had unfortunately died just before reaching Southampton.

This paper will be published in full in the Society's 'Transactions.'

The following (eighth) letter on the Ornithology of Buenos Ayres, addressed to the Secretary by Mr. W. H. Hudson, C.M.Z.S., was read:—

Buenos Ayres, May 19, 1870.

DEAR SIR,—While you are just beginning to experience and observe the reviving influences of spring, the bitter weather of the last few days "feelingly persuades" us that the cold season has come to Buenos Ayres. We have already had enough of rain, wind, frost, and cloudy days to make this May one of unusual gloom. The wild and melancholy notes of Winter Snipes and Plovers, that are always most numerous in severe seasons, are constantly heard, while of the summer visitors not a solitary straggler is to be seen, and the trees, that according to some theorists have no business to be growing on the Pampas, are fast losing their few remaining leaves.

It is interesting to observe the effect of the cold weather on some of our resident birds—for example, the Urraca (*Cyanocorax pileatus*), to which probably the first Spanish settlers gave this name from a fancy that it resembles the Magpie of Europe. The long tail of the Urraca, so awkward in windy weather, its slow laborious flight, scanty plumage, and climbing feet, in all things so different from the true Pampas birds, prove it to have been adapted to a hot climate in a country abounding in forests. It is, I believe, common in South Brazil, Paraguay, and the Chaco. The manner in which many species inhabiting these regions reach and become natives of this country I have tried to explain in former letters. The Urraca and birds like it with short wings, that obtain their food in woody districts, could only have extended so far into a country ill adapted to them by gradually advancing along the unbroken line of woods that border the Plata and its tributaries. In this littoral forest the Urraca is most numerous, becoming rarer the further we advance west from it; but though it feeds much on the ground, it is never seen far from the vicinity of trees, except, as happens with the Pampas Woodpecker (*Colaptes campestris*), when passing from one isolated wood or plantation to another.

The Urraca is in winter a miserable bird, and appears to suffer more than any other creature from cold. In the evening the flock, usually composed of from ten to twenty individuals, gathers on a thick branch of a tree sheltered from the wind, the birds crowding close together for warmth, and some of them roosting perched on the backs of their fellows. I once saw six birds roosting in this manner—two of them resting on the tree, perched on the branch, and one on their backs, so that they formed a perfect pyramid. But

with all this a heavy frost is sure to prove fatal to one or more birds in the flock, and sometimes several individuals that have dropped from the branches stiff with cold may be found under the trees where they have roosted. In the morning, if fair, the flock betakes itself to some large tree on which the sun shines, and settle on the outermost twigs on its eastern side, each bird with its wings drooping and its back turned towards the sun. In this attitude, so spiritless, but denoting such great sagacity, they spend an hour or two warming their blood and drying the dew from their scanty dress. During the day they bask much in the sun, and towards night may be again seen on the sunny side of a hedge or tree warming their backs in the last rays. It is owing, I think, to its fecundity and to an abundance of food that the *Urraca* is able to maintain its place in our fauna; otherwise the cold, its only enemy, would surely prove fatal to it.

With the return of warm weather it becomes active, noisy, and the gayest of birds; the flock constantly wanders about from place to place, the birds flying in a scattered desultory manner one behind the other, and incessantly uttering, while on the wing, a querulous, complaining cry. At intervals through the day they utter a species of song, composed of a number of long modulated whistling notes, the first powerful and vehement, and becoming at each repetition lower and shorter, then suddenly ending in a succession of hoarse internal notes resembling the heavy breathing or snoring of a man asleep. When approached, the whole flock breaks out into a chorus of alarm, with notes so annoyingly loud, shrill, and sustained, that the intruder, be it man or beast, is generally glad to quit their vicinity. As the breeding-season approaches, they are heard, probably the males, to utter a variety of low and soft chattering notes; they then separate in pairs and grow more silent, becoming also very circumspect in their movements. The nest is usually built in a large thorn tree, and is composed of rather stout sticks; these are sometimes so rudely put together that the eggs fall from it. Other nests are found more ingeniously constructed, deep, and lined with fibres of weeds, dry or green leaves. The nest usually contains six or seven eggs, but often more; and I have once found one with fourteen. It seems incredible that one bird should have laid all these eggs, the eggs being so very large in proportion to the bird's size; yet there was but one pair of *Urracas* in the neighbourhood of this nest, for I had watched them from the moment they began to build. The eggs, when fresh, are very beautiful, being of a rich sky-blue, thickly spotted with white. The white spots are composed of a soft calcareous substance, apparently deposited on the surface of the shell after its complete formation. When the egg is newly laid, they may be easily washed off with water, and are so extremely delicate that their purity is lost on the egg being taken into the hand. The young birds hatched from these lovely eggs are proverbial for their ugliness, *Pichon de Urraca* being an epithet commonly applied here to a person remarkable for want of comeliness. They are as filthy as they are ugly, so that the nest, generally containing six or eight young,

is pleasant neither to sight nor smell. But there is something extremely ludicrous in the notes of these young birds, resembling, as they do, the shrill half hysterical laughter of a female exhausted by over indulgence in mirth.

A few summers ago there was a brood of young Urracas in a tree close to my house. Every time we heard the parent bird hurrying to her young with food in her beak we used to run to the door to hear them. As soon as the old bird reached the nest they would burst forth into such wild extravagant peals, and continue them so long, that we could not but think it a rich amusement to listen to them. When taken young, Urracas become very tame and make bold, noisy, mischievous pets, fond of climbing over and tugging at the clothes, buttons, and hair of their master or mistress. Though somewhat fierce-looking, the *Urraca* is the most peaceable of birds, never quarrelling with his fellows. Their food, like that of the Cuckoos, consists principally of large insects; they also prey on mice and small reptiles, and in winter and spring may be seen following the plough to pick up worms in company with the Blackbirds, Gulls, and other species widely differing in their natures.

I am, yours &c.,

WILLIAM H. HUDSON.

The following papers were read:—

1. Additional Notes on the Introduction of *Salmonidæ* into Tasmania. By MORTON ALLPORT, F.Z.S., F.L.S.

Dr. Günther has written informing me that the Salmonoid sent to England at the end of last year, and referred to in my former paper*, was an example of Sea-trout (*Salmo trutta*). This determination of the species would have sufficiently proved the success of the experiment as to one of the migratory Salmonidæ, had not Dr. Günther added the following remarks:—"I am informed that a lot of Sea-trout eggs were forwarded to Tasmania several years ago and hatched in May 1866. If you never on any other occasion received eggs of *Salmo trutta*, it would follow that this example is three and a half years old, and consequently a what may be called stunted individual, as a fish of that age ought to have attained to a larger size, and to exhibit a certain development of the sexual organs, of which no trace could be discovered in the individual sent. As it often, almost always, happens that individuals from the same lot of eggs are very unequally developed, the condition of this individual does not prove that its brethren are in an equally undeveloped state; others may have attained to the normal size and weight."

Having carefully watched the progress of the fish in Tasmania, I am unable to reconcile this assumption, that the specimen sent to England must necessarily be $3\frac{1}{2}$ years old, with the facts.

The Tasmanian Salmon Commissioners received but one shipment

* P. Z. S. 1870, p. 14.

of the ova of *Salmo trutta*, which arrived in April 1866. These ova were kept in a separate hatching-box, and hatched in May following. Part of the fry were placed in the same pond with the Salmon-fry hatched that year; the residue were placed in a separate pond and rill constructed for them. In October 1867, more than half of the fry in the Salmon-pond assumed the smolt dress and went to sea, the gratings being purposely removed. In October 1868, all that were left of the fry in the Salmon-pond put on the smolt scales and left for sea.

Of the fry placed in the other pond, a number assumed the smolt dress in October 1867, but were purposely kept back, in the hope that spawn might be obtained without the usual migration seawards. The smolts became very restless; several threw themselves on to the banks and were destroyed; others died, and amongst them one which I preserved and have forwarded by this mail for preservation to the Society.

In October 1868, all the fishes that were left in the separate pond, and which had not become smolts the year before, put on the bright scales and exhibited the usual restlessness. Again several died, and before the commencement of winter, in May 1869, the Commissioners lowered the water to make certain alterations in the pond, and found the fishes reduced in number to twelve, all of which were handsome silvery fishes, without the slightest trace of parr markings, and varying in weight from nearly half a pound to more than a pound. During June and July 1869, five spawning rids were constructed by these fishes in the rill attached to their pond. The old fishes were then shut off from the rill by a fine wire grating, to prevent their interfering with the ova, which commenced hatching in September. In December 1869, 500 of the fry from these ova were set at liberty in the River Huron, the remainder being retained to increase the breeding stock, and to ascertain whether the migratory instinct would recur in these fish.

The fry so retained are now, at eight months old, the picture of health, and exhibit the brilliant orange fin from which the trivial English name of the parr of *Salmo trutta* is derived. One of these parr I have also forwarded for preservation to the Society.

From the foregoing details it is manifest that, if the specimen sent to England was hatched from ova received in April 1866, that fish must have left our pond as a smolt in October 1868, and remained a year, either in the river or in the sea, without adding one inch to its length, or one ounce to its weight, while its brethren, unnaturally detained in fresh water, not only increased in size, but arrived at sexual maturity and deposited healthy ova.

From Dr. Günther's letter it is clear that, if he had received the fish sent from a Scotch instead of a Tasmanian river, he would have pronounced it a healthy fish, as it might then have been a smolt of either 15 months or 27 months old without presenting any abnormal conditions; and is it not quite possible that a few pairs of the smolts which went to sea in October 1867 may have returned to the river (as many British authorities hold they do) in the February following as breeding fish, which would deposit ova in June or July

1868, which ova would, in October 1869, have furnished fishes in the very condition of the specimen sent?

The circumstances of the capture of the two smolts strongly confirm this last view; for since the commencement of the experiment, the sea-beaches on which they were caught have been persistently fished with seine nets and rewards have been offered to the fishermen for any unknown fishes captured; yet out of about 4000 Salmon-smolts which went to sea during 1864 and 1865, and about 6000 which went during 1867 and 1868, not a single specimen was caught, while (if the fish sent was $3\frac{1}{2}$ years old) out of about 200 Salmon-trout smolts liberated in 1867 and 1868, two have been taken; for the second specimen, though larger than that sent, and caught in a separate locality, is identical in species and condition, and therefore equally abortive. It is, moreover, difficult to believe that abortive fishes would voluntarily travel more than 30 miles in obedience to an instinct given them to perfect those very organs which in their case are absent. Unless the Salmon-trout have bred in Tasmanian waters, the doctrine of chance has been strangely overridden in this case.

It may be urged that, as none of the fishes retained in the breeding-pond spawned in the winter of 1868, it is unlikely that any of those liberated did so; but may not the unnatural detention in fresh water have retarded the development of the fishes in the pond? A great majority of the Common Trout (*Salmo fario*) hatched in September 1866, spawned in June and July 1868; and some of those Salmon-trout which went to sea may well have attained sexual maturity in the same period.

About six weeks after the capture of the two smolts before referred to, a much larger specimen was caught on one of the same sea-beaches. This fish is exactly what would be called in many English rivers a Sprod; and, after carefully comparing it with the written descriptions of Yarrell and Dr. Günther, I can only conclude it is a true *Salmo salar*. This last specimen I have also forwarded for presentation to the Society, in the hope that some competent authority may examine and report upon it*.

2. On the Anatomy of *Ælurus fulgens*, Fr. Cuv.

By WILLIAM HENRY FLOWER, F.R.S., V.P.Z.S., &c.

The animal which forms the subject of the present communication was first brought under the notice of zoologists by General Hardwicke, in a paper read before the Linnean Society, Nov. 6, 1821, entitled "Description of a new Genus of the Class Mammalia, from the Himalaya chain of Hills between Nepaul and the Snowy Mountains." The publication of this paper was unfortunately delayed for

* Dr. Günther has examined this specimen, and has found that it presents the usual characters by which *Salmo salar* is distinguishable from its nearest allies.—Ed.

about six years*, when the name by which the author had characterized the animal was withdrawn in favour of *AILURUS*†, bestowed upon it by Fr. Cuvier, who in the meantime had received a specimen from M. Duvaucel, and given a coloured figure of the entire animal, and a full description of its external characters, in the fiftieth number of the 'Histoire Naturelle des Mammifères' (vol. iii.), June 1825. M. Cuvier uses the word "Panda" as the trivial name, and proposes the generic term *Ailurus* "à cause de sa ressemblance extérieure avec le Chat." This was not a very happy choice, as in all structural characters indicative of true affinity it is almost as widely removed from the true Cats as any member of the group of terrestrial Carnivora.

With the skin sent to the Paris Museum by M. Duvaucel were the jaw-bones and teeth, wanting the posterior molars, and also the bones of the feet. These are the only fragments of the osteology of *Ælurus* figured or described in De Blainville's 'Ostéographie.'

For further information upon the habits and structure of the "Panda," or "Wáh," as it was now called, we are indebted to a paper by Mr. Bryan H. Hodgson in 'Journ. Asiat. Soc. Bengal,' vol. xvi. p. 1113 (1847). Unfortunately, at the time of writing this notice, Mr. Hodgson's original manuscript, containing, as he says, "a full and careful description of the habits and of the hard and soft anatomy of *Ailurus*," had been lost, and consequently the anatomical description, as published, is exceedingly meagre and unsatisfactory. It constitutes, however, the whole of the information possessed at at present upon the subject. The paper is illustrated by slight sketches of the external appearance of the animal in several attitudes, and of the base of the skull and the mandible, with much-worn teeth.

Woodcuts of the side view of the skull and palate are given in Dr. Gray's "Revision of the Ursidæ" (P. Z. S. 1864, p. 708). Although of no use for details of structure, they serve to show the general outline of the cranium and the peculiar form of the mandible.

On the 22nd of May 1869, a living specimen of *Ælurus* (the first which had reached Europe) arrived at the Society's Gardens, having been presented by Dr. H. Simpson. It was captured in the neighbourhood of Darjeeling. Notices relating to this specimen will be found in P. Z. S. 1869, p. 278, *ibid.* p. 408, with a woodcut-illustration from life, *ibid.* p. 507. Pl. xli. of the same volume contains a coloured lithograph of the animal drawn from life ‡.

* Trans. Linn. Soc. vol. xv. 1827. Tab. ii. contains figures of the feet and teeth. It is scarcely necessary to remark that the truncation of the cusps of the molar teeth, attributed by Hardwicke to original structure, and as such carefully described among the generic characters, is certainly due to attrition from use. In the present example, as well as in that figured by De Blainville, the apices of these cusps are perfect.

† Modified by Van der Hoeven (Handbuch der Zoologie) into *Ælurus*.

‡ Mr. Hodgson remarks that he never observed the specimens of *Æluri* kept alive by him "employ the hands, as the Raccoons and Coatis and Bears do, to facilitate the process of eating." Bearing this remark in mind, it may be noticed with surprise that, in the figure alluded to above, the animal is represented as holding a bunch of fruit in its fore paw; but this was a circumstance so constantly noted during its residence in the Zoological Gardens, that it was thought worth while to commemorate the habit in the portrait. (See Mr. Bartlett's "Remarks on the Habits of the Panda in Captivity," P. Z. S. 1870, p. 769.)

On its arrival it was in an extremely feeble and emaciated condition, though, under the careful treatment of the Superintendent of the Gardens, it gradually recovered health and strength; but, while apparently in excellent condition, it died suddenly in the night of December 12, and was sent to the Royal College of Surgeons on the following morning.

Unfortunately my other engagements were then so numerous that I was not able to undertake as complete an examination of the anatomy of this interesting animal as I could have wished, and I have not since had time or opportunity to make such a detailed comparison of its structure with that of allied forms as may be desirable. As, however, the opportunity of dissecting an *Ælurus* may not occur again for some time, I think it right not to withhold any longer from the Society such notes as I have made, especially as they relate to most of the essential points required to determine the affinities and position of the genus.

The animal was a male, and of full size, though incomplete union of the epiphyses of some of the larger limb-bones, and the unworn condition of the teeth (of which the permanent set were all in place), showed that it had but just attained to adult age.

It was in exceedingly good condition—the subcutaneous tissue and the mesentery and subperitoneal tissue being loaded with fat. The only morbid appearances observed throughout the dissection were certain hæmorrhagic spots, presently to be described, in the intestinal canal; but after the preparation of the skeleton it became evident that the bones generally were soft and spongy in texture, a condition not unusual in animals which die under the abnormal or unhealthy circumstances to which they are subjected in captivity.

The weight of the animal was $9\frac{1}{2}$ lbs. It measured from the end of the nose to the root of the tail 24"; the tail was 17" long without the hair, or, to the end of the hairy tip, $19\frac{1}{2}$ ". These dimensions, as well as the weight, slightly exceed those given by Hodgson for a mature male animal.

The external characters of *Ælurus* are too well known to need further description; but some details regarding the structure of the limbs may be noted. Amid the dense woolly covering of the under surface of the feet, the merest rudiments of naked pads can be detected by separating the hairs under the prominences formed by the articulation between the second and third phalanges of each digit; and there is a larger, transversely oval, bare space $\cdot 4$ " across, covered by pink, soft skin, and scarcely forming any prominence, in the place of the usual palmar or plantar pad.

The claws are of nearly equal size, and semiretractile on both fore and hind feet. When allowed to take their natural position, the middle phalanx is bent down nearly at a right angle with the proximal phalanx, but the terminal phalanx projects forwards, so that the end of the claw is always exposed, extending distinctly beyond the dense hairy clothing of the foot. There is a strong elastic ligament to maintain this position. The claws are very sharp, moderately curved and much compressed, $\cdot 75$ " long, measured in a straight line from base to tip, and $\cdot 35$ " deep at the base.

The feet are very broad, and evenly rounded in front. The following table* shows the relative length of the five digits of each foot, measured from a common base-line, the hinder edge of the palm or sole, as the case might be, to the tip of each claw:—

	Manus.	Pes.
1st digit.....	2·1"	3·5"
2nd „	2·9	4·3
3rd „	3·3	4·6
4th „	3·1	4·4
5th „	2·7	4·1

THE BRAIN.

The general form of the brain, and the arrangement of the sulci and gyri of the hemispheres, are shown in figs. 1, 2, and 3. The length of each cerebral hemisphere was 2·2", and the greatest width of the entire brain near the posterior part of the hemispheres 1·8". The cerebral capacity, taken from a cast of the interior of the skull, was 3 cubic inches.

Both the form of the hemispheres and the disposition of the gyri upon their surface are eminently characteristic of the arctoid group of the Carnivora, as pointed out in P. Z. S. 1869, p. 482. They resemble very closely those of *Procyon*. It should be remarked that there is a noticeable want of exact bilateral symmetry.

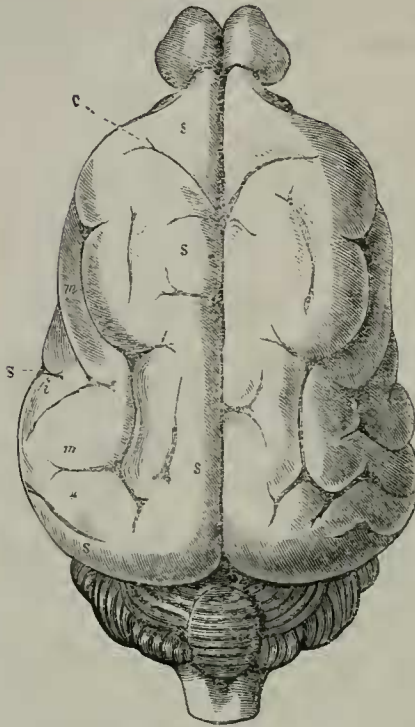
The sylvian fissure (*S*) is situated rather behind the middle of the side of the hemisphere, and inclines upwards and backwards, being nearly ·6" long. The internal gyrus (*i i*), which immediately surrounds it, has the anterior limb much narrower than the posterior; the angle at which the gyrus is folded on itself above is very acute; the lower part of the posterior limb is broad, and indented by a short sulcus descending from the middle of the sylvian fissure, and which is not found, or is only slightly indicated, in *Ursus*, *Procyon*, and *Nusua*.

The middle gyrus (*m m*) is of nearly uniform thickness throughout, is marked by a few secondary sulci, and surrounds the internal gyrus in the whole of its extent.

The superior gyrus (*s s*) is large and complex. Commencing in the supraorbital region, close to the root of the olfactory lobe, it passes forwards and inwards, and winds round the supraorbital sulcus (*O*); then it bends outwards round the strongly marked crucial sulcus (*C*), behind which it is very broad, and almost divided into two by a well-marked longitudinal sulcus. In the middle of the hemisphere, above the apex of the sylvian fissure, it is narrower and straight. Posteriorly it winds round the middle gyrus, and forms the hinder margin of the hemisphere, being distinctly divided from the middle gyrus almost as far as the lower border of the temporal lobe. On the left side, however, there is a bridging convolution (*) between these two gyri, wanting on the right.

* From notes kindly taken for me by my friend Mr. John C. Galton, M.A.

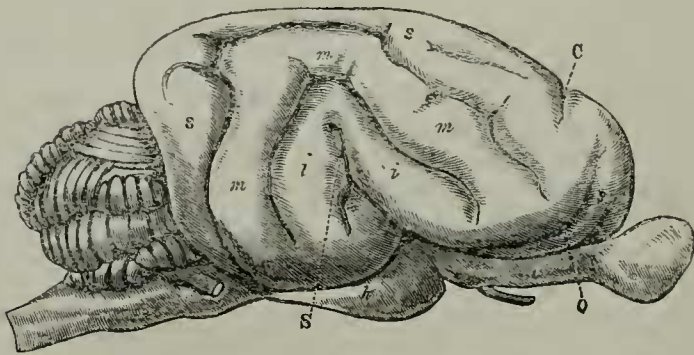
Fig. 1.



Upper surface of the brain; natural size.

- C.* Crucial sulcus. *S.* Sylvian fissure. *s.* Superior external gyrus. *m.* Middle external gyrus. *i.* Inferior external gyrus. The cerebellum is rather more exposed in these figures than when the brain was *in situ*.

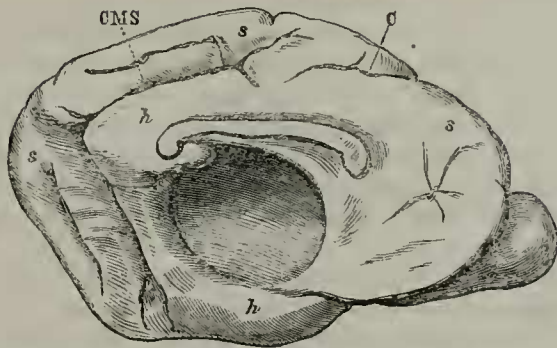
Fig. 2.



Side view of the brain; natural size.

- S.* Sylvian fissure. *C.* Crucial sulcus. *O.* Supraorbital sulcus. *s.* Superior external gyrus. *m.* Middle external gyrus. *i.* Inferior external gyrus. *h.* Hippocampal gyrus.

Fig. 3.



Inner surface of left cerebral hemisphere; natural size.

CMS. Calloso-marginal sulcus. *C*. Crucial sulcus. *s*. Superior external gyrus. *h*. Hippocampal gyrus.

On the inner side of the hemisphere, the crucial sulcus (*C*) is strongly marked, running obliquely backwards. The horizontal portion of the calloso-marginal sulcus (*CMS*) is short, not extending further forward than over the middle of the corpus callosum; so that, anteriorly to this spot, the internal or hippocampal gyrus (*h*) is not distinguishable from the superior (*s*). Posteriorly the sulcus bends downwards and forwards at a sharp angle, separating the hippocampal gyrus in front from a broad descending portion of the superior gyrus (*s*) behind. The latter is divided by a strongly marked sulcus, lying parallel with the descending portion of the calloso-marginal sulcus, into two parallel portions of nearly equal breadth.

The corpus callosum is .9" in length.

The cerebellum is 1.3" broad, and projects by nearly half its antero-posterior length behind the posterior margin of the cerebral hemispheres. It appeared to present no notable difference in form from that of other allied species.

MOUTH, TONGUE, AND LARYNX.

The mucous membrane lining the buccal cavity is smooth, and of a pale pink colour, but black at the edges, especially upon the inside of the upper lip. The gums surrounding the incisors, especially the upper series, are mottled with black.

The palate is of very peculiar form; it is concave immediately behind the incisor teeth, then becomes convex between the posterior premolars, and is hollowed again between the true molars. The ridges are not very prominent or regular; those placed most anteriorly form a wide curve with the concavity backwards, extending completely across the palate, though slightly broken in the middle line; they gradually slope more and more backwards at their outer ends. Behind the seventh there are two or three not quite symme-

trical, and not passing across the middle line. Beyond the posterior molar teeth the palate is quite smooth, and the cavity of the mouth becomes narrow and tubular, the soft palate terminating by a thin straight edge, without uvula, rather more than an inch behind the end of the middle line of the hard palate.

On each side of the fauces, opposite the root of the tongue, the tonsils appear as very distinct, longitudinally disposed, saccular depressions, $\frac{1}{4}$ inch in length, the inferior margins of which are everted, hard, and tumid, and form conspicuous elongated fusiform elevations.

The tongue appears to have no special extensibility. It is rather thick and fleshy in its posterior half. Its dorsal surface is flat anteriorly. From the base it slightly widens forwards to the middle, then gradually narrows towards the apex, which is somewhat abruptly truncated. It is 3" long from base to tip, 1.1" in greatest breadth, .5" wide close to the tip; the apex projects .8" beyond the frænum.

The papillæ are small and soft, consisting of numerous small, rounded "conical" papillæ (which are longer and more pointed at the base and edges than elsewhere), scattered "fungiform" papillæ—and an irregular V-shaped group of "circumvallate" papillæ, of which there are seven on the left and but four on the right side; two of the latter, however, are of double the size of any of the others, and oval in shape.

At the base of the frænum is a small flattened, bilobed sublingual process, .2" in width.

The lower border of the parotid gland is nearly straight, 2" from before backwards; above, the gland is divided into two portions, one rising in front of, the other behind, the meatus auditorius; the latter is twice the size of the former. The duct leaves the anterior inferior angle of the gland, and runs directly forwards across the masseter muscle, and enters the mouth opposite the hinder edge of the third premolar. The submaxillary gland is small and oval, broader behind than in front, somewhat compressed, 1" in length, .5" in greatest thickness, with a small accessory gland composed of very loosely connected lobules lying at the upper anterior border, and which has a distinct duct which joins the main duct of the submaxillary half an inch from the principal gland. The conjoined duct, 2 inches in length, terminates in an orifice at the under surface of the sublingual process.

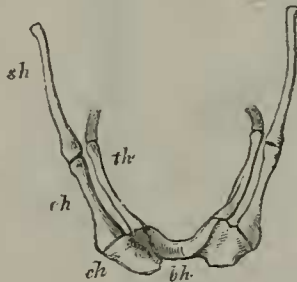
The epiglottis is in the form of an equilateral triangle, each side of which is $\frac{1}{2}$ " long. The apex is scarcely at all rounded. Both upper and lower vocal cords are very distinct, with a well-marked ventricle between them. The upper or false cords are very thin, but prominent, ridges; the lower or true vocal cords are flattened bands, with the upper edge the most distinct. The thyroid cartilage is very narrow from above downwards, measuring but .15" in the middle of each ala. Anteriorly it has a deep median notch in the inferior border. Near the external end of the same border is a well-marked triangular eminence, projecting forwards and outwards, to

which the sterno-thyroidens muscle is attached. The posterior border is convex, and elongated to the length of half an inch from above downwards by the development of the superior and inferior cornua. The cricoid cartilage is continuous across the middle line in front, but very narrow (not more than $\cdot 1''$) from above downwards; posteriorly it widens to $\cdot 4''$; it is convex externally at the sides, the upper and lower margins being much everted.

The thyroid bodies are each of a flattened, irregular oval form, lying on the sides of the trachea, extending from the lower edge of the cricoid cartilage to the sixth tracheal ring, and connected together below by a long and narrow band, which passes across the front of that ring. The greatest length of each of these bodies is $\cdot 7''$, the greatest width $\cdot 5''$; and the band which connects them is $\cdot 5''$ in length.

The hyoid bones (fig. 4) consist of a basihyal (*bh*), forming a broad arch, deeply emarginate behind, $\cdot 4''$ wide from side to side. The anterior cornu has three bones in close contact. The stylo-hyals (*sh*) are slender, $\cdot 6''$ long, and very slightly curved. The epihyals (*eh*) are shorter and broader, especially at the lower ends, where they

Fig. 4.



Anterior view of hyoid bones; natural size.

sh. Stylo-hyal. *eh*. Epihyal. *ch*. Cerato-hyal. *bh*. Basihyal. *th*. Thyro-hyal.

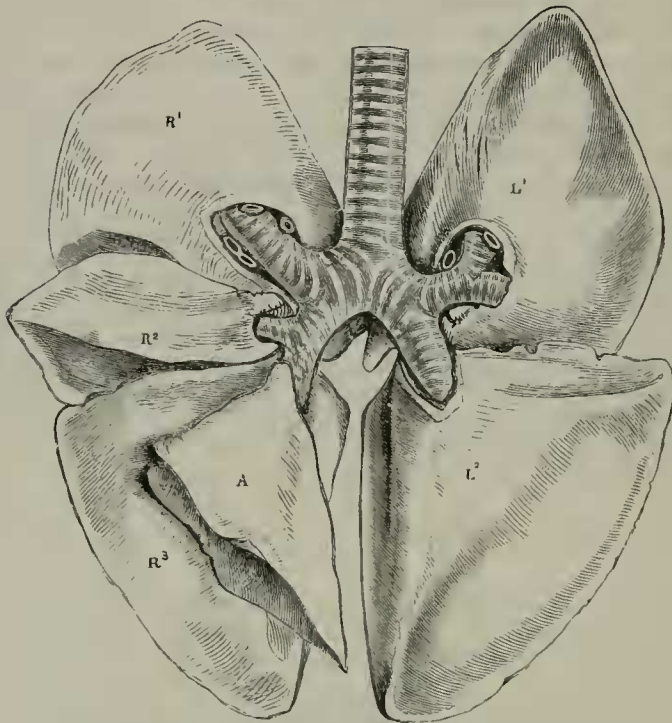
are expanded and flattened; they are $\cdot 4''$ long. The cerato-hyals (*ch*) are nearly as broad as long, with a strong crest on the anterior superior border. The thyro-hyals (*th*) are compressed, broad at their basal and narrow at their thyroïdal extremity, slightly curved upwards, and $\cdot 45''$ in length.

THORACIC VISCERA.

The trachæa is $4\frac{1}{2}''$ in length, and $\frac{1}{2}''$ in average width. It has thirty-eight cartilaginous rings. The musculo-membranous space behind the rings is $\cdot 2''$ wide. It divides into two short bronchi, each of which divides again into an upper and lower branch as it enters the root of the lung to which it is destined; the left bronchus is slightly longer, and not so capacious as the right.

The left lung (fig. 5) consists of two triangular lobes (L^1 and L^2), separated almost completely by a horizontal fissure. One of the main divisions of the bronchus enters into each. The upper lobe is slightly smaller than the lower one.

Fig. 5.



Anterior surface of the lungs; two-thirds the natural size.

R^1 . Right upper lobe. R^2 . Right middle lobe. R^3 . Right lower lobe.
A. Azygous lobe. L^1 . Left upper lobe. L^2 . Left lower lobe.

The right lung has an upper (R^1) and lower lobe (R^3) corresponding closely in size and form with those of the left lung; and, in addition, a small middle lobe (R^2) between the two, and a pointed "azygous" lobe (*A*) lying in front of the inner edge of the lower lobe. The two latter receive bronchial branches from the lower main division of the right bronchus, the upper division being confined in its distribution to the upper lobe of the lung. All four lobes are slightly connected together by lung-tissue at their base.

The thymus is very conspicuous. It is an oblong compressed, or rather trihedral, body, with one edge turned forwards and to the right and one surface backwards, and of a pale flesh-colour. Its length is 1.5", its greatest thickness .5". It lies in front of the upper part of the heart and great vessels—its lower end, which is rounded and rather larger than the upper, lying over the anterior surface of the right ventricle, and the upper end in front of the first

ascending branch of the aorta, reaching as far as the origin of the right subclavian.

The pericardium is loaded with fat. The heart is rather a narrow cone in form, with a rounded apex. Its length is 2"; its greatest thickness from side to side 1.5", from before backwards 1.3".

The aorta gives off two main branches. The first, or innominate, ascends for 1.1", when it gives off the right subclavian; after a further course of .3" it bifurcates into the two carotids. The left subclavian is given off from the aorta .1" beyond the innominate.

The red blood-corpuscles were measured by Mr. Gulliver, who ascertained that their average diameter was $\frac{1}{3764}$ of an inch, thus nearly corresponding with those of *Procyon*, *Nasua*, and *Meles**.

ABDOMINAL VISCERA.

On opening the abdominal cavity, no portion of the liver was visible below the margins of the ribs. The stomach was highly distended with gas; its lower border was 6 inches below the inferior extremity of the sternum. The omentum extended to halfway between the lower border of the stomach and the pubis, and was loaded with fat, disposed in ribbon-like flakes, filling up the sulci between the intestinal convolutions. The tongue-shaped extremity of the bright-red spleen was seen applied to the lower part of the left side of the stomach. The nearly empty bladder, with the urachus, could be seen at the lower extremity of the abdominal cavity; the space between this viscus and the lower border of the stomach was occupied by the intestinal convolutions. The subperitoneal fat was very abundant, especially at the posterior portion of the abdominal cavity in the lumbar region below the kidneys.

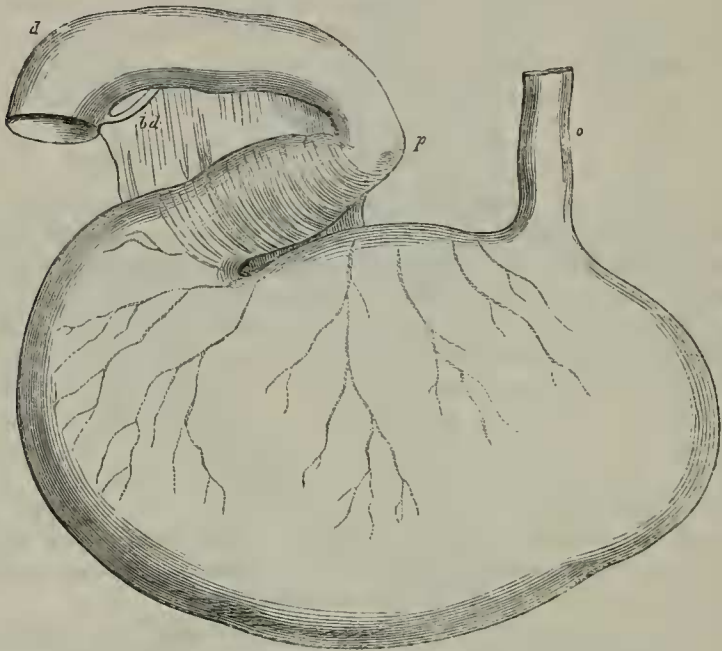
The stomach (fig. 6), when moderately distended was in the form of a short oval, with the greatest diameter about the middle. The fundus was not very large, the œsophagus entering near the cardiac extremity. The pyloric portion was narrow and tubular, marked by a slight constriction from the main part of the viscus, and sharply bent upwards and to the left, being held by a peritoneal fold close to the upper border (or lesser curvature) of the main part of the stomach. The pylorus is thus brought very near to the œsophagus, and turned directly upwards. The walls of the stomach were thin, except at the pyloric end, where the circular muscular fibres were strongly developed.

The duodenum, at its commencement, was $\frac{1}{2}$ inch in diameter, but rapidly widened to 1 inch. The entire length of the intestinal canal from pylorus to anus was 8 feet 8 inches. There was no cæcum or any perceptible distinction externally between ileum and colon, as the calibre of the tube gradually diminished from the end of the duodenum to the commencement of the rectum, where it was again slightly enlarged. The descending colon passed almost straight to the rectum, inclining slightly from the left to the mesial line of

* See P. Z. S. 1870, p. 94.

the body. Numerous hæmorrhagic blotches on the mucous membrane of the upper portion of the intestine were the only pathological changes observed in any of the viscera of the animal. Some blood had been extravasated into the intestinal canal. The villi of the upper part of the small intestine are long, delicate, and close-set. In the middle part of the canal they are smaller and less numerous, the lining membrane being quite smooth at many places; but towards the

Fig. 6.



Anterior view of the stomach; half the natural size.

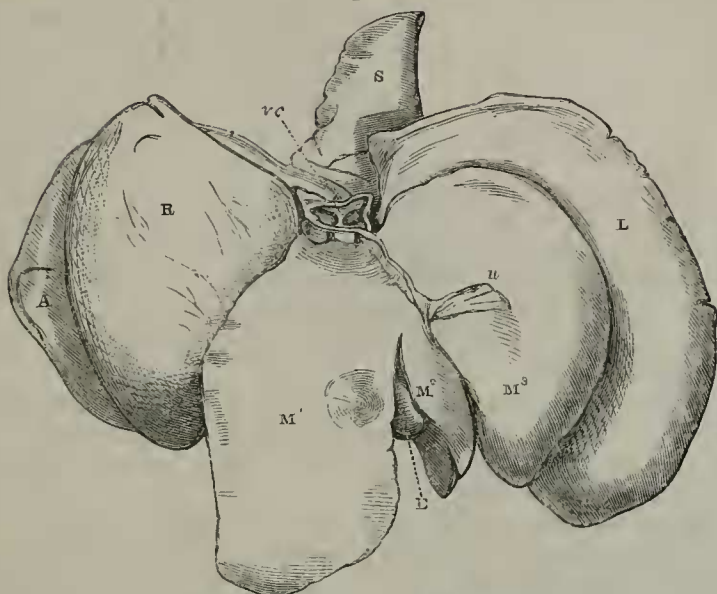
o. (Esophagus. *p.* Pylorus. *d.* Duodenum. *bd.* Biliary duct.

lower end they become very abundant, though comparatively short and thick. They entirely and suddenly cease 9 inches above the anus; and thenceforth the mucous membrane is smooth, though thrown into longitudinal rugæ. There are only three distinct Peyer's patches, all nearly circular: the first, $\frac{1}{4}$ inch in diameter, is 18 inches below the pylorus, the second, about twice the size, 39 inches from the pylorus, and the third, as small as the first, 13 inches lower.

The liver (figs. 7 & 8) consists of three main divisions:—1. The left lobe (*L*) is simple, flattened, with a thin free border, notched in several places, and a rounded outline; on its inferior surface, close to the transverse fissure, is a small tongue-shaped accessory lobule (*a*), of which there was no trace in *Proteles* (P.Z.S. 1869, p. 489)*, and above this a deep straight horizontal fissure an inch in length. 2. The middle or cystic lobe, the lateral margins of which overlap both left and

* This lobule is slightly indicated in *Nasua*.

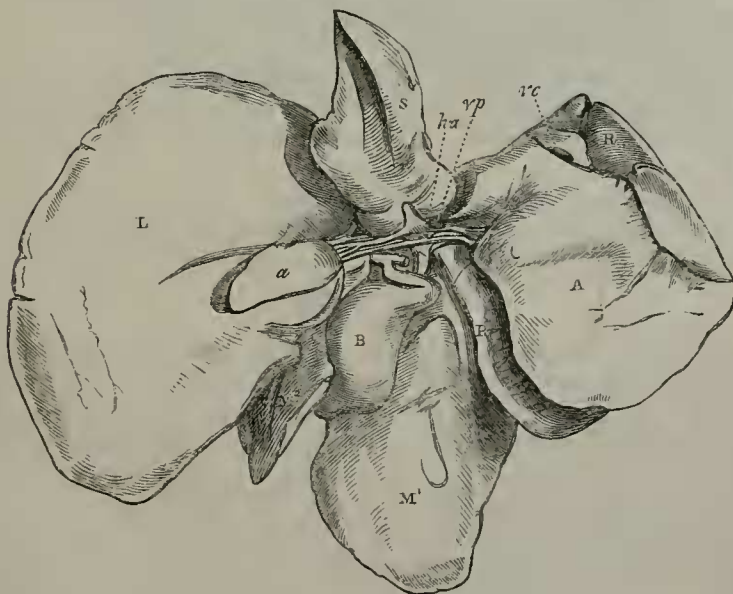
Fig. 7.



Upper surface of liver; half the natural size.

R. Right lobe. A. Accessory right (or caudate) lobe. M¹, M², and M³. Divisions of the middle lobe. L. Left lobe. S. Spigelian lobe. B. Gall-bladder. vc. Vena cava inferior. u. Round ligament, or remains of umbilical vein.

Fig. 8.



Under surface of liver; half the natural size.

L. Left lobe. a. Accessory left lobe. M¹, M². Divisions of middle lobe (M³ is concealed by L). R. Right lobe. A. Accessory right (or caudate) lobe. B. Gall-bladder. S. Spigelian lobe. ha. Hepatic artery. vp. Vena porta. vc. Vena cava.

right lobes, is deeply divided by the fissure, through which the round ligament (*u*) passes, into a left and right portion; the former (M^3) is subtriangular, with a pointed free extremity, and not further subdivided; the latter (M^1) is rather the larger of the two, and, very near its left border, has a deep cleft in which the gall-bladder (*B*) is situated, the fundus being visible on the upper surface of the liver in this cleft. There is thus a distinct, narrow, tongue-shaped lobule (M^2) between the umbilical and the cystic fissures*. 3. The right lobe (*R*) is rather smaller, though thicker, than the left, and of a sub-square form. It has the usual two accessory lobules on its under surface—the pyramidal pointed Spigelian lobule (*S*), and a remarkably large caudate lobule (*A*), grooved above for the inferior vena cava, and projecting beyond the right lateral margin of the main superior division of the lobe †.

The inferior vena cava (*vc*) perforates the upper or posterior border of the right lobe, running for a distance of an inch and a half under a bridge of the hepatic substance, at its emergence from which it is joined by the hepatic veins.

The gall-bladder is of the usual pyriform shape. The commencement of the duct is sharply bent upon the neck of the bladder, and it makes another sharp bend in the contrary direction at the junction of the hepatic ducts. Its fundus (*B*) appears on the upper surface of the liver in the cleft between the divisions of the lobe marked M^1 and M^2 in the figure. It also displaces the substance of M^1 a short distance to the right of the fissure, and appears on the surface only covered by the external capsule of the liver.

The spleen is elongated and perfectly simple, without any notch or fissure, rather broader at the lower than at the upper end. Its length is 5·7", and its greatest breadth 1".

The right kidney is placed very slightly higher than the left. These organs are perfectly simple, having no indications of division into lobuli on their surface. The length of each is 1·9", its greatest breadth 1·1".

The suprarenal bodies are placed close to the upper end of each kidney; they are small, oval, and somewhat flattened, ·35" in greatest length.

PELVIC VISCERA.

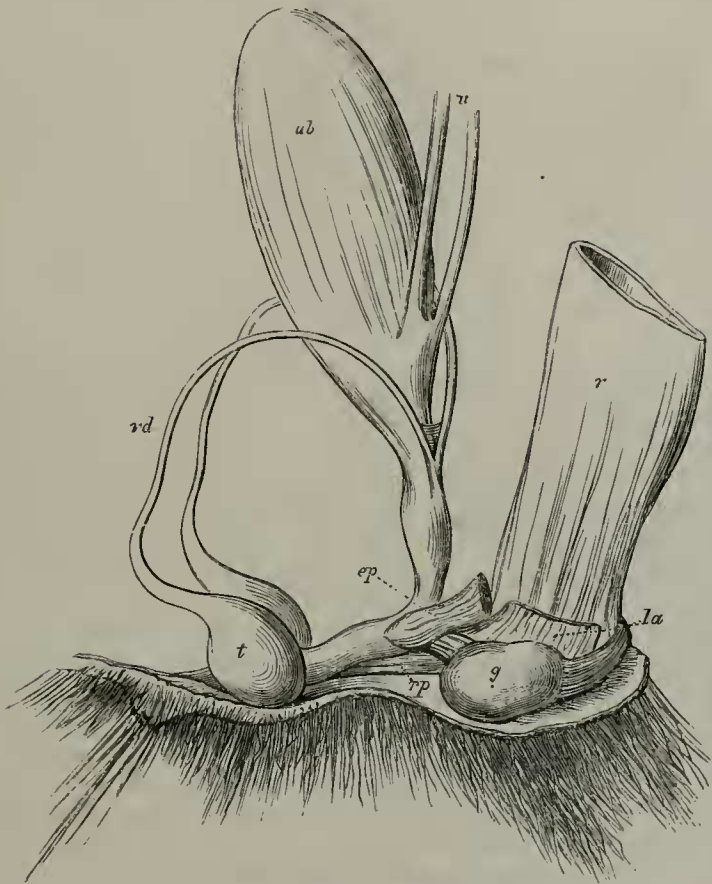
Organs of generation.—Externally the generative organs are small and inconspicuous (see fig. 9). On the hinder part of the under surface of the abdomen, $2\frac{1}{2}$ inches in front of the anus, is a short conical prepuce, directed forwards, and projecting scarcely more than $\frac{1}{4}$ inch above the level of the surrounding skin; it is nearly naked, and pale-coloured, but it has a few long stiff hairs growing around the orifice on its summit. Behind this the penis forms scarcely any appreciable median prominence. There is no proper scrotum; but the testes form distinct rounded prominences, about $\frac{1}{2}$ inch in diameter, under the skin, with a flat interval of

* In *Nasua* this is of relatively larger size.

† In *Nasua* the proportions of these lobules are very similar.

$\frac{1}{2}$ inch between them; they are placed rather nearer to the orifice of the prepuce than to the anus.

Fig. 9.



Side view of pelvic viscera; three-fourths the natural size.

t. Testicle. *vd.* Vas deferens. *ub.* Urinary bladder. *u.* Ureter. *r.* Rectum. *ep.* Erector penis muscle. *rp.* Retractor penis. *la.* Levator ani. *g.* Anal gland.

The middle of the perineum is more scantily clothed with hair than the rest of the under surface of the body. There is a distinct muscular sphincter beneath the skin around the orifice of the prepuce.

The penis is rather small, being 2" in length from the junction of the crura to the end of the glans. The latter, when in the non-erect condition, appears to consist (as in the allied genera) of little more than the bone, covered by a delicate lax integument. The orifice of the urethra is rather large, and has a prolonged bilobed inferior lip. The os penis (fig. 10) is .9" long, curved, with the convexity downwards or towards the urethra, slender but thicker behind than in

front, rounded posteriorly, compressed in the middle, where it is triangular in section, broad above and narrow below, the sides being longitudinally grooved, and rather depressed and spatulate at its anterior extremity*.

Fig. 10.



Bone of the penis; natural size.
a. Dorsal surface. b. Side view.

The portion of the urethra between the urinary bladder and penis is fusiform, the walls being thickened, but presents no distinct salient prostate gland. The vasa deferentia enter near the middle of this portion; and there are neither vesiculæ seminales nor Cowper's glands, — *Ælurus* agreeing in all these respects with the other artoid carnivores. The testes are .8" in length, and .5" in greatest thickness.

Anal glands †.—In the usual position, on each side of the termination of the rectum, is an oval or, rather, pyriform body (*g*), with its broadest end directed forwards, .8" in length and .5" in greatest thickness. It has a thin muscular covering developed out of the sphincter ani, and which is prolonged backwards as a strong muscular band, encircling the anus posteriorly, and in front is inserted into the under surface of the penis at the junction of the crura. The levator ani (*la*) is inserted just above the sphincter, in the fissure between it and the muscular coat of the rectum. The retractor penis (*rp*) arises from the anterior surface of the rectum, just below, or external to, the anterior portion of the sphincter.

Each gland is a very thin-walled capsule, with a smooth, rather shining, lining membrane, and was filled with a soft, cheesy, yellowish-white substance. Its orifice is placed rather in front of the middle of the sac, and opens just within the lateral margin of the anus.

A circle, an inch in diameter, around the anus is quite free from hair, and covered with a soft, pale-coloured, corrugated skin, with numerous large sebaceous glands. There is no supra-anal follicle or group of glands.

* In the relative size and form of the os penis, *Ælurus* rather resembles the true Bears than the typical *Procyonidæ*, in all of which animals this structure is very greatly developed and usually bilobed anteriorly. In *Procyon* it is 4" in length, in *Nasua* 3" to 3¼", and in *Bassaris* 2".

† The existence of these glands is denied by Hodgson, *loc. cit.* p. 1124. The same author remarks that *Ælurus* is free from all offensive odour; but Dr. Simpson (P. Z. S. 1869, p. 507) says that it has "the power of emitting a strong odour of musk when excited."

CONCLUSION.

With reference to the skeleton, I must content myself on the present occasion with noting that the vertebral formula is C. 7, D. 14, L. 6, S. 3, C. 18*, that there is no trace of a clavicle, and that the humerus has a supracondylar perforation.

It will be seen from the foregoing notes that, in all essential points of its structure, *Ælurus* conforms to the other arctoid or bear-like carnivora, a group comprising the *Ursidæ*, *Procyonidæ*, and the *Mustelidæ*. The question remains whether it can be included in either of those three families, or whether it must constitute a family for itself.

In the structure of the viscera, the minor modifications from the general type characteristic of the section have not yet been studied with sufficient attention, or in a sufficient series of species, to be made use of in dividing the families or genera. This, however, is a subject to which the attention of systematic zoologists will naturally be more closely directed when the consideration of the external and more easily accessible characters becomes exhausted, or fails to supply the required information.

In the mean time, the dental characters, and more especially the number and form of the true molars, are generally relied on as, at all events, the most convenient for diagnosis. All the known *Ursidæ* have $\frac{2}{3}$ of these teeth on each side, all the known *Procyonidæ* $\frac{2}{2}$, and all the known *Mustelidæ* $\frac{1}{2}$, or in one case but $\frac{1}{1}$.

The *Ursidæ* are characterized by the greatest development of the molar series backwards; for not only is there an additional molar in the lower jaw, wanting in all the other forms, but the posterior molar in the upper jaw is a very large tooth; and in all the most typical, or, rather, most specialized, Bears (*Ursus* proper) it is actually longer from before backwards than the tooth in front of it. In *Melursus*, and the section of *Ursus* called *Helarctos*, this tooth is scarcely, if at all, longer than the one in front of it; and the same is the case in the very generalized extinct *Hyenarctos*. In the *Procyonidæ*, on the other hand, it is always smaller than the tooth in front of it, thus indicating a transition to the condition of total absence met with in all the *Mustelidæ*.

The existing *Ursidæ* also differ, not only from the *Procyonidæ*, but from all other Carnivora, in the structure of the last upper pre-molar, or "sectorial tooth" of the more typical members of the order. This tooth usually consists essentially of a more or less compressed and cuspidated "blade" supported on two roots, and an inner lobe (almost always near the anterior end of the blade) supported by a distinct root. In the *Ursidæ* alone the third root is wanting, and the inner lobe is either absent or quite at the posterior end of the blade, supported on a thickening of the posterior root †.

* Hodgson gives thirteen dorsal and five lumbar vertebrae, but states that he had not a perfect skeleton by him to refer to while writing.

† In a specimen of *Melursus labiatus* in the Museum of the Royal College of Surgeons there is a small third root on the inner side of the last upper pre-molar, but this is confined to the tooth of one side of the jaw only.

The tooth is also, relatively to the others, much smaller than in the rest of the Carnivora. In the *Procyonidæ* the sectorial has a very broad inner lobe, usually with an anterior and a posterior cusp, and is supported by a distinct third root, median in position as regards the blade. In *Ælurus* the inner lobe is still larger, having, besides the two cusps, a more internal one upon the cingulum, and is supported by a large antero-median third root. Even the tooth in front of this has a large inner lobe, apparently supported on a third root, which exists in no other carnivore; but this is in conformity with the general characteristic, viz. great transverse breadth, of the whole molar series.

Although the molar teeth of *Ælurus*, at first sight, appear so different from those of any other carnivore, a close examination shows that they are essentially formed upon the same plan as those of *Procyon*, the differences arising from the sharper and more pronounced condition of the cusps, and the greater development and cuspidation of the external and, especially, the internal cingulum. These differences are certainly less than many which occur in different genera of other recognized families, the *Mustelidæ* or *Viverridæ* for example; and it would be difficult to formulate them as family characteristics, especially if the equally aberrant *Cercoleptes* has to be included in the definition of the *Procyonidæ*.

The presence or absence of a bridge of bone on the outer side of the pterygoid plate of the alisphenoid, forming an "alisphenoid canal," through which the external carotid artery passes, has been shown to be remarkably constant in the different minor groups or families of the Carnivora*, all the true *Ursidæ* having this canal, and all known *Procyonidæ* and *Mustelidæ*, without exception, wanting it. *Ælurus* in this respect agrees with the *Ursidæ*, and is separated from the *Procyonidæ*; and though this character must have some importance, it may fairly be considered questionable whether alone it is sufficient to constitute a family distinction.

The exceptional habitat of *Ælurus* may also be taken into account, all the true *Procyonidæ* being confined to the New World; but although it would be more satisfactory in some respects to find structural characters agreeing with geographical distribution, there are too many cases of the contrary to lay much stress upon this circumstance. Both the nearly allied families *Ursidæ* and *Mustelidæ* are very widely distributed, the latter being almost cosmopolitan; and there is no *à priori* reason, except paucity of species, why the *Procyonidæ* should not be so also.

Of the general affinities and position of *Ælurus*, I do not doubt that they are indicated by the place I assigned to it in the diagram of the relations of the existing Carnivora in a former communication (P. Z. S. 1869, p. 37). The only question is whether, as a matter of convenience, we should draw the line which includes the *Procyonidæ* round this Asiatic genus also, or whether, as in that diagram, we should keep *Ælurus* outside that group, as a member of

* See H. N. Turner, P. Z. S. 1848, p. 63; and also W. H. Flower, *ibid.* 1869, p. 4.

a closely allied but distinct family. This is a point which may still be left open for discussion. Some light will probably be thrown upon it when details are published of the structure of a remarkable new mammal lately obtained in Eastern Thibet by M. l'Abbé David, and briefly noticed by M. Alphonse Milne-Edwards under the name of *Ailuropoda* *. This is a creature as large as some of the smaller species of Bear, but with the dental formula of the *Procyonidæ*, and, as far as can be judged from a slight sketch of the skull kindly sent to me by M. Milne-Edwards, not very distantly related to the animal now under consideration.

The drawings which illustrate this communication have been made from preparations of the viscera of *Ælurus*, which, together with the skeleton, are preserved in the Museum of the Royal College of Surgeons.

3. Remarks on the Habits of the Panda (*Ælurus fulgens*) in Captivity. By A. D. BARTLETT, Superintendent of the Society's Gardens.

On the 22nd of May 1869, the subject of this notice was received at the Gardens. I found the animal in a very exhausted condition, not able to stand, and so weak that it could with difficulty crawl from one end of its long cage to the other. It was suffering from frequent discharges of frothy, slimy fæcal matter. This filth had so completely covered and matted its fur, that its appearance and smell was most offensive.

The instructions I received with reference to its food were, that it had had about a quart of milk per day, with a little boiled rice and grass.

It was evident that this food, the change of climate, the sea voyage, or the treatment on board ship had reduced the poor beast to this pitiable condition.

My first object was to endeavour to support the little life that remained by a change of food. I first tried raw and boiled chicken, rabbit, and other animal substances, all of which it refused to eat.

I found, however, it would take arrow-root, with the yolks of eggs and sugar mixed with boiled milk; and in a few days I saw some improvement in its condition. I then gave it strong beef-tea well sweetened, adding pea-flour, Indian-corn flour, and other farinaceous food, varying the mixture daily. The fondness of the animal for sweet food was remarkable; and by adding a little sugar to the meat that had been boiled to make the beef-tea, it was induced to eat it freely.

Finding a great improvement in the strength of the Panda, and the weather being fine, I gave him his liberty, by letting him out of his cage into the garden in front of my house (having a boy to see that he did not escape); he soon began to eat a few leaves and the tender

* Annales des Sciences Naturelles, 5^e séries, vol. xiii. (1870) p. 18.

shoots of the roses, and, finding some unripe apples that had fallen from the trees, greedily devoured them. I had a fear they might disagree with him; this, however, was not the case, for he rapidly improved in condition. At night his usual supply of beef-tea &c. was given to him in his cage; and this was always consumed by morning.

We have in the Gardens two or three trees upon which grow bunches of yellow berries (*Pyrus vestita*). Upon giving some of these to the Panda, I noticed his fondness of them. He would grasp the bunch in his paw, holding it tightly, and bite off these berries one by one; so delighted with this food was he, that all other food was left as long as these berries lasted. I have every reason to believe that berries, fruit, and other vegetable substances constitute the food of this animal in a wild state.

It was upon this food the animal became more vigorous, and the old ragged and matted coat was thrown off, and the beautiful new fur began to grow rapidly. One important operation was performed almost every morning, that of a shower-bath, administered by means of a garden-syringe; this was done before letting him out of his cage; it induced him to bask in the sun, to clean and dry himself. The biting, scratching, and shaking to get rid of the old and clotted fur was a sure sign of good health. Animals recovering from sickness show signs of improvement by their attempts to clean themselves; and it is of the utmost importance to aid them, by judicious means, to accomplish this object. Many valuable animals are lost in consequence of their neglected condition; they fret and die more on account of the filth about them than from actual disease, although disease is a sure attendant upon animals allowed to become filthy.

This individual was not disposed to become a pet; for, notwithstanding every attempt to induce it to be caressed, it continued to exhibit a rather fierce and angry disposition—probably only an individual peculiarity, and not at all characteristic of the species.

When offended, it would rush at me and strike with both feet, not, like a cat, sideways or downwards, but forward, and the body raised like a bear, the claws projecting, but not hooked or brought down like the claws of a cat; for although the claws are partly retractile, the animal cannot use them in that manner. At the moment of making the attack, it would utter a sharp spitting hiss; this, and a weak, single, squeaking call-note, are the only sounds I ever heard it utter.

Its mode of progression on the ground corresponds with that of the Kinkajou, Otter, and Weasel—running on all fours, or jumping with a kind of gallop, its back rather arched. In climbing, the Panda is not quite so expert in trees as the Kinkajou, the prehensile tail of which renders that animal much assistance in swinging from branch to branch. The Kinkajou has also a far higher intelligence.

In forming an opinion of the affinities of the Panda from its general appearance and habits, as far as it is possible to judge of these by observing an animal in captivity, I am led to remark the strong

resemblance to the Kinkajou in its movements, running, walking, climbing, mode of feeding, and its food.

In drinking, it inserted the lips, and would suck up the fluid after the manner of Bears; it does not lap like the Dog or Cat.

At the same time the fur of the Panda, not only in quality but also in the colour and marking, especially that of the tail, exhibits a remarkable affinity to the Coati, Raccoon, and Binturong.

I am, however, more inclined to think its affinities are greater with the Kinkajou than with any other animal. The Coati and Raccoon are far more carnivorous than the Panda, Kinkajou, or Binturong; they are also less nocturnal than these last mentioned species.

In the use of the front paws the most perfect of the animals alluded to in this paper is perhaps the Raccoon, of which the naked toes form a strong contrast with the thickly muffled foot of the Panda—the fur covering the whole of the underside of the foot of this animal, except a space about the size of a small pea in the middle pad. This thick clothing of the paw would lead one to doubt whether the Panda would grasp with its paw as firmly and perfectly as I have seen it do.

The eyes of the Panda are small and Bear-like. It does not appear to have the power of smelling well developed, like the Coati or Raccoon; it is also much slower in all its movements than those animals.

I must not omit to remark that the voice of the Panda, Kinkajou, Otter, and Coati are wonderfully alike, especially the short faint squeak, or call-note.

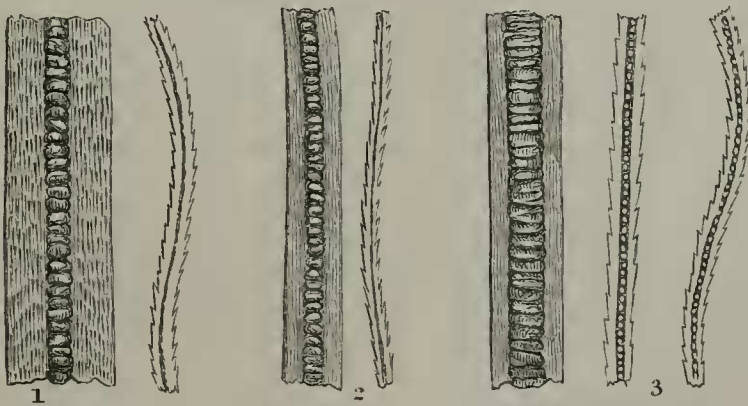


Fig. 1. Hair and wool of *Ursus piscator*, magnified.
 2. Hair and wool of *Cercoleptes caudivolvulus*, magnified.
 3. Hair and wool (two varieties of) of *Ailurus fulgens*, magnified.

I have submitted a small portion of the hair or fur of the Panda to my friend Mr. Richter, in order to have it examined under the microscope, and to obtain his opinion.

I will read an extract from his letter, which was accompanied by the drawing which I now exhibit.

“I have examined the hair of the Panda, and compared it with that of some of the Bears. I send you a sketch of some of these hairs. The Panda is evidently a more woolly animal than most of the Bears, and its hair shows a larger development of the medullary cells; but these differences are of very slight consequence, so little, indeed, that they might only signify a mere specific distinction. If the hair of the Panda were to grow a little harsher, and include rather less wool, it might, as to construction, be that of a true Bear. You say that the Bear grows its hair in *tufts*; this is certainly the case with the Panda. The hairs of the Panda are quite simple, like those of any other mammal, and each one proceeds from its own follicle; but the follicles being collected into groups, and not evenly dispersed over the surface, the tufted appearance is caused at once.

“I do not know if this is the case with the Kinkajou. I think the Panda’s hair is more like that of a Bear than the Kinkajou’s.”

4. Notes on the Arrangement of the Genera of Delphinoid Whales. By Dr. J. E. GRAY, F.R.S. &c.

The *Delphinoidea*, or Toothed Whales, which have teeth in both jaws and a single crescent blower, have been divided by the shape of the skull; and in the ‘Catalogue of Seals and Whales’ I have attempted to divide them into sections according to the form of the pectoral fin. But the imperfect materials at my command did not enable me to carry out the plan to my satisfaction.

The description of the skeletons of several genera which were before unknown, as that of *Steno* by Mr. Flower, *Pontoporia* by Dr. Burmeister, and the examination of several skeletons which I had not before seen, have enabled me to carry out this plan on a more secure basis; and the result of the examination may be condensed into the following disposition.

Pontoporia, which has the head like *Inia* and *Steno*, has a short fin truncated at the end, like *Plantanista* and *Catodon*, and differs from all these in having linear longitudinal nostrils: *Orca*, for example, which has a skull like many of the other *Dolphins*, but is so much more ferocious, has a short, broad, rounded fin; and *Beluga* and *Monodon* are peculiar for having a small ovate pectoral fin.

- I. Pectoral fin elongate, falcate, acute; hand longer than the arm-bones; fingers very unequal, the second and third being much longer than the other three.
 - A. Pectoral fins from the sides of the body; the second and third fingers of six or eight phalanges; the head beaked. *Iniadæ* and *Delphinidæ*, including the genera *Steno*, *Sotalia*, *Delphinus*, *Clymenia*, *Delphinapterus*, *Tursio*, *Eutropia*, *Orcaella*, *Electra*, *Leucopleurus*, *Lagenorhynchus*, *Feresa*, *Pseudorca*, *Phocæna*, *Acanthodelphis*, and *Neomeris*.

B. Pectoral fins low down on the sides of the body, narrow and elongate; second and third fingers very long, of nine or ten phalanges; head swollen, subglobular. *Globiocephalidæ*: *Grampus*, *Globiocephalus*, *Sphærocephalus*.

II. Pectoral fin short, broad, rounded or truncated at the end, shorter than the arm-bones; second finger rather the longest, the rest gradually shorter, second finger with six or eight phalanges.
 1. *Orcadæ*: *Orca*, *Ophesia*. 2. *Belugidæ*: *Beluga*, *Monodon*.
 3. *Pontoporiidæ*: *Pontoporia*.

5. Remarks on the Genus *Triphoris* (Desh.), with Descriptions of new Species. By W. HARPER PEASE, C.M.Z.S.

Eighty-eight species of the above genus are known (including the following), distributed as follows:—East Indies and Polynesia, seventy-three; Australia, six; Panama, one; West Indies, four; Mediterranean, two; localities unknown, two.

Of the species described by M. Deshayes inhabiting the island of Bourbon, two are synonyms of Polynesian species; two of those described by Prof. Adams from Panama are synonymous, and the remaining one a *Cerithiopsis* *. I also exclude several described under the above genus, which prove to belong to *Bittium*.

Mr. Hinds having collected a large number of species during the voyage of the 'Sulphur,' classified them according to shape. A more natural and certainly more distinct arrangement would be according to sculpture, with which the disposition of colours also agrees. Of one section, the species are encircled by two or three rows of granules or beads, and the colours regularly disposed; the other, those which are smoothly keeled, colours mottled.

Colours in this genus, and their arrangement, are constant, and may be relied on as a specific guide.

With few exceptions, the specimens from which the descriptions heretofore published have been drawn up were imperfect or immature. In consequence, probably, of greater advantages in collecting, I have obtained perfect specimens of thirty-six species, and of a large number in all stages of growth. The spire becomes developed early and remains constant; the last whorl and outer lip pass through several stages of growth. The young are planulate at base, the shell of a pyramidal form; as the last whorl is developed and assumes its normal form, the outer lip unites at base with the whorl and is produced in the shape of a tubular canal; posteriorly a perforation is formed at its junction with the body-whorl, though frequently only a broad sinus is left. The edges of the perforation are generally slightly everted; and on four species only, so far as I am aware, it is produced in tubular shape, similar to the basal canal, viz. *T. mira-*

* *Teste* Carpenter, P. Z. S. 1863, p. 350.

bilis (Ad.), *T. mirificus* (Desh.), *T. perfectus* (Pse.), and *T. cylindricus* (Pse.). Judging from the names attached to the two former species, they were considered of abnormal form; they present, however, the characters of the genus fully developed. The figures in the 'Voyage of the Samarang' illustrate fairly the different stages of growth; two are mature, viz. figs. 28 and 37.

The following I suppose to be new.

1. TRIPHORIS SIMILIS.

T. turrita, vix subulata, nitida; anfractibus duodecim, seriebus tribus granorum cingulatis, seriebus granulisque æqualibus et regularibus; sutura sulcata; canali basali brevi, verticali; apertura oblique ovata, superne acute angulata; flavescens, serie superna granorum rubida.

Long. 5, diam. $1\frac{3}{4}$ mill.

Hab. Insl. Kauai.

The above may be distinguished from *bicolor* (Pse.) and also *cinguliferus* (Pse.), to both of which species it is allied, by the upper row of granules only being red. It also differs in sculpture.

2. TRIPHORIS MINIMUS.

T. subulato-turrita, nitida, tenuiuscula, omnino rosacea; anfractibus decem, biserialiter æqualiter granulosis, interstitiis linea granulosa cingulatis; canali basali brevi; apertura subcirculari.

Long. 3, diam. 1 mill.

Hab. Insl. Howland, Insl. Kauai.

The smallest of the genus, so far as known.

3. TRIPHORIS PALLIDUS.

T. elongato-cylindræcea, nitida, omnino albida; anfractibus numerosis, triseriatim granulosis, serie mediana minore; sutura lirata; canali basali brevi, recurvo; apertura parva, oblique ovata.

Long. 7, diam. $2\frac{1}{4}$ mill.

Hab. Insl. Kauai.

A slender species without any peculiar character.

4. TRIPHORIS SULCOSUS.

T. elongato-turrita, nitida; anfractibus tredecim, triseriatim æqualiter granulosis, longitudinaliter tenuiter striatis; sutura late sulcata; canali basali recurvo; apertura subcirculari, fere verticali; alba, serie superiore granorum fusca, sutura interdum fusca.

Long. $7\frac{1}{2}$, diam. $2\frac{1}{2}$ mill.

Hab. Insl. Kauai.

5. TRIPHORIS GRACILIS.

T. subulata, solida; anfractibus quatuordecim, biserialiter æqualiter granulosis; interstitiis linea tenui granulosa cingulatis,

et tenuissime striatis; canali basali brevi, recurvo; apertura fere circulari; rubida, serie inferiore granorum cerea.

Long. 8, diam. $2\frac{1}{2}$ mill.

Hab. Ins. Kauai.

The striking contrast between the circle of waxen-coloured beads on a dark red renders the above species conspicuous and easily recognizable.

6. TRIPHORIS PERFECTUS.

T. turrata, tenuiuscula, nitida; anfractibus decem, cingulis duabus granorum ornatis, serie inferiore majore, moniliformi; sutura sulcata; canali basali oblique recurvo; canali posteriore tubulato, elongato, clauso, repando; apertura circulari; alba, serie superiore granorum rufescenti-fusca.

Long. 4, diam. $1\frac{1}{4}$ mill.

Hab. Ins. Kauai.

I have attached the above name to this species, as it represents the genus fully developed.

T. mirabilis (C. B. Ad.) and *T. mirificus* (Desh.) are of the same type.

7. TRIPHORIS PUNCTATUS.

T. elongato-turrata, solida; anfractibus quatuordecim, tricarinatis, carina mediana multo minore, interstitiis valde punctatis; sutura sulcata, lævi; apertura subcirculari; alba, pallide fusco et rosaceo irregulariter maculata.

Long. 9, diam. $2\frac{3}{4}$ mill.

Hab. Ins. Annaa.

The above may be recognized by the deep punctures between the spiral keels, and smooth sutures.

8. TRIPHORIS COSTATUS.

T. subulata, solida, transversim costata, costis æqualibus, regularibus, contiguis, subgranosis, planulatis; sutura incerta; canali brevi, recurvo; apertura subcirculari; basi albida, spira cinereo-fusca.

Long. 8, diam. $2\frac{1}{2}$ mill.

Hab. Ins. Annaa.

This species is made up of a series of equal-sized ribs, closely contiguous, rather plane, and somewhat granose; I have not been able to determine where the suture runs.

9. TRIPHORIS ROBUSTUS.

T. abbreviato-subulata, solida; anfractibus decem, biserialiter æqualiter granosis, longitudinaliter tenui-striatis; interstitiis suturaque linea subgranulosa spiraliter cingulatis; canali basali brevi, recurvo; apertura subcirculari; seriebus granorum albedo, fusco et flavo maculatis; sutura lata, rosacea.

Long. 6, diam. $2\frac{1}{4}$ mill.

Hab. Ins. Makaimo.

10. TRIPHORIS CYLINDRICUS.

T. elongata, gracilis, cylindracea, solida; anfractibus numerosis, triseriatim granulosis, serie mediana minore, transversim tenuissime striatis, ad basin punctulatis; canali basali brevi, recurvo, canali posteriore apertura clausa, tubulato, subcirculari; omnino alba.

Long. 12, diam. $2\frac{3}{4}$ mill.

Hab. Ins. Apaiang.

An elongate slender shell, the only one of large size, of which the posterior canal is closed and produced in tubular form.

11. TRIPHORIS GRANOSUS.

T. elongato-subulata, solida; anfractibus biseriatim æqualiter granulosis, interstitiis linea granulosa cingulatis; canali basali brevi, valde recurvo; apertura subcirculari; pallide fusca, granulis albis.

Long. 6, diam. $1\frac{3}{4}$ mill.

Hab. Ins. Tahiti.

12. TRIPHORIS TUBERCULATUS.

T. subulata, solida; anfractibus duodecim, triseriatim granulosis, serie mediana paulo minore, canali basali brevi, recurvo; apertura subcirculari; fusco alboque irregulariter maculata.

Long. 8, diam. $2\frac{1}{4}$ mill.

Hab. Ins. Kauai.

This is the only granulated species I have met with on which the colours are not regularly disposed.

13. TRIPHORIS ORYZA.

T. abbreviato-subulata, robusta, solida; anfractibus decem, triseriatim æqualiter granulosis; canali basali brevi, recurvo; apertura subcirculari; apice acuto; lutescens, serie superiore granorum alba; basi fusco bilineata.

Long. 4, diam. $1\frac{1}{4}$ mill.

Hab. Ins. Kauai.

14. TRIPHORIS PUSTULOSUS.

T. elongata, cylindracea, solida; anfractibus tredecim, triseriatim granulosis, serie inferiore minore, longitudinaliter subcostatis, costis supra suturam continuis; sutura concavo-sulcata; lutescens, granis albidis, interstitiis granorum rubidis.

Long. 11, diam. $2\frac{1}{2}$ mill.

Hab. Ins. Kauai.

The interstices between the granules being stained with red gives the shell a pustulated appearance.

The granules follow each other in regular succession, one under the other, and connected with each other, and over the suture as well, by a slightly elevated rib.

15. *TRIPHORIS MACULATUS*.

T. subulata, robusta, solida; anfractibus decem, triseriatim granulosis, serie superiore multo majore, serie mediana lineari; canali basali brevi, recurvo; apertura subcirculari; serie superiore granorum lutescente, seriebus inferioribus fuscis, albo irregulariter maculatis.

Long. 7, diam. $2\frac{1}{4}$ mill.

Hab. Ins. Kauai.

16. *TRIPHORIS BRUNNEUS*.

T. subulata, solida; anfractibus duodecim, triseriatim granulosis, interstitiis suturaque punctulatis, serie granorum mediana paulo minore; canali basali oblique producto; apertura obliqua, late ellipsoidea; serie superiore granorum fusca, seriebus inferioribus cineraceis.

Long. 7, diam. $2\frac{1}{4}$ mill.

Hab. Ins. Apaiang.

17. *TRIPHORIS GRACILIS*.

T. elongato-cylindræa, solida, nitida; anfractibus quatuordecim, longitudinaliter irregulariter costulatis, triseriatim spiritaliter granulosis, granis æqualibus, longitudinaliter costulis convexis; canali basali brevi; rosacea, serie superiore granorum pallida.

Long. 7, diam. $1\frac{3}{4}$ mill.

Hab. Ins. Kauai.

6. Note on Abnormities in the Neuration of the Hind Wings in *Acræa andromacha*. By A. G. BUTLER, F.L.S.

I have recently had occasion to look into the structural characters of the butterflies constituting the subfamily *Acræinæ*, and whilst so doing I have discovered a fact of great interest and some importance with regard to the neuration of *Acræa andromacha*, Fabr.

I have carefully examined eighteen specimens of the above species, and found aberrant characters in three of them; they differ from each other and from the typical form as follows:—

1. Differs from typical form in the possession of a short spur, about $\frac{1}{16}$ of an inch in length, emitted from the inner edge of the first subcostal branch of hind wing at about $\frac{1}{3}$ of its length from its origin; only occurs on the left-hand wing.

2. Differs from preceding in the length and position of the spur, which measures about $\frac{1}{8}$ of an inch, and is emitted at about $\frac{1}{3}$ of the length of the subcostal from its termination.

3. Differs from first form in the possession of a spur about $\frac{1}{8}$ of an inch in length emitted from inner edge of subcostal in right-hand wing and in a position exactly corresponding to the spur of the left-hand wing.

When I first observed a spur from the subcostal in form 1 of the above species, I supposed that it was an ordinary monstrosity; but finding that exactly one-sixth of the specimens in the Museum collection possessed the same character, more or less developed from the same nervure, I thought it a fact of some significance and worthy of being recorded. It is well known that the greater number of the genera of diurnal Lepidoptera are founded upon neural characters, and in the genus *Ithomia* the species are separated chiefly by slight modifications in the venation of the hind wing. If, then, any species can be proved to exhibit inconstancy in the venation of its hind wings, it must, at the least, cast the shadow of a doubt upon the value of species which are precisely alike in every character but this.

Secondly. I think the above modifications interesting, as showing how characters do occur which, if of any advantage to the species, may be further developed by natural selection, and thus result in forming distinct genera. In a paper which I have recently published upon the genera of the Pierinæ (a subfamily which I maintain to be most constant in neuration) I have found it necessary to divide the genera into three groups, distinguished from each other by the number of branches to the subcostal nervure in the front wings; an additional branch to the subcostal in the hind wings would be quite as important a character, and would have the effect of widely separating two genera, otherwise allied, in any systematic arrangement founded upon structural characters.

7. Description of a New Indian Lizard of the Genus *Calotes*.

By Dr. A. GÜNTHER, F.Z.S. &c.

(Plate XLV.)

Mr. Jerdon has brought home with him a considerable number of examples of Khasyan *Calotes*, and has convinced me that two species have been hitherto confounded under the name of *Calotes maria* (Gray). The one has the scales of the throat of rather small size; the supertympanic series of spines is at a distance from the tympanum; the nuchal spines are narrow, slender, very rigid, and not flexible; besides, this form has never a black streak through the eye. To this form belongs the largest of the four typical examples of *Calotes maria*, which name, therefore, must be retained for it. Mr. Blyth's diagnosis of his *Calotes platyceps* agrees entirely with this form, and not with the next, as supposed by Mr. Jerdon (Proc. As. Soc. Bengal, 1870, p. 77).

The second form, Mr. Jerdon informs me, remains always of smaller dimensions; the nearly perfect identity of coloration of certain specimens with others of *C. maria* is a very surprising fact, the differences from this species being solely structural. Its gular scales are large; the supertympanic series of spines is immediately above



A

B

A. *Calotes jerdonii*, male B. *Calotes marmorata*, male



2

J Smif

J Smil. del.

M & N Hanhart imp.

1 CHLOROSPIRIGUS GOERINGI.
2. DIGLOSSA GLORIOSA.



J. Smith del.

W. H. Barnard sculp.

UROCHROMA DIRECTISSIMA.

the tympanum; the nuchal spines are low, broad, triangular, strongly compressed laminae; specimens with black radiating streaks through the eye are very common. This form requires to be named; and I have great pleasure in dedicating it to Mr. Jerdon, who of late years has worked so successfully to supplement and correct the observations made by him many years ago. This species will stand as *Calotes jerdoni*.

For the accompanying illustration (Plate XLV.) I have chosen specimens with different ornamental colours, the bright coloration of the head of the male of *C. maria* being peculiar to this sex during the breeding-season.

8. On Venezuelan Birds collected by Mr. A. Goering. By
P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN,
M.A., F.L.S.—Part IV.*

(Plates XLVI., XLVII.)

In our last article on Mr. Goering's collections we spoke of his intended expedition into the Sierra Nevada of Merida. The collection made by Mr. Goering during this journey has lately been received in this country, and we now proceed to give an account of it.

As we have already stated, Mr. Goering reached Merida by way of the Lake of Maracaibo and Zuliar, arriving in that city on the 5th of April, 1869. From that date until the following August the weather was unusually dry.

From Merida Mr. Goering made excursions to the Paramos de la Culata, which lie on the ridges to the north of the city, and also to the Sierra Nevada, which overhangs it on the south. He also visited the Laguna de Urao, or Natron Lake, which lies some miles to the west of Merida, and the Puente Natural, or Natural Bridge, of Copas, north-west of Merida on the River Copas, which flows into the Lake of Maracaibo, where there is a nesting-place of *Steatornis caripensis*.

Leaving Merida on the 30th of October, 1869, Mr. Goering set out to return by land to Puerto Cabello, intending to collect *en route*. But on reaching Carache a revolution broke out, which rendered it necessary for him to retreat to the Lake of Maracaibo, and so by sea to La Guayra.

In Merida and its vicinity Mr. Goering formed a collection of 135 specimens of birds, which are referable to 106 species. Amongst these, as will be seen by the subjoined list, are many of great interest to the naturalist, and not less than nine which appear to have been hitherto undescribed †. This is hardly to be wondered at when we

* See Part I., P. Z. S. 1868, p. 165; Part II., P. Z. S. 1868, p. 626; and Part III., P. Z. S. 1869, p. 250.

† *Scotophaga albifrons*.
Diglossa gloriosa.
Chlorospingus goeringi.
Buarremon meridaæ.
Grallaria griseonucha.

Ochthoeca superciliosa.
— *nigrita*.
Conurus rhodocephalus.
Urochroma dilectissima.

consider that no zoological collector has, so far as we are aware, previously visited Merida, although certain well-known botanists (Messrs. Linden, Funk, and Schlim), in search of Orchids, devoted a certain amount of attention to the *Trochilidæ* of that district, and discovered several brilliant new species of this group, which have been described by Bourcier, Parzudaki, and other authors.

We now give a complete list of the species obtained by Mr. Goering, to which are added descriptions of the new species, and remarks upon such of the known ones as call for observation.

The nomenclature adopted is, as in former papers, that of Sclater's Catalogue of American Birds.

Fam. TURDIDÆ.

- *1. *Turdus albiventris*, Spix. Merida.
- *2. *Turdus scerranus*, Tsch. Merida.

Fam. CINCLIDÆ.

- *3. *Cinclus leuconotus* Merida.

Fam. TROGLODYTIDÆ.

- *4. *Heleodytes griseus* S. E. of Merida.
- *5. *Henicorhina leucophrys* Merida, Upper wood-region.

Fam. MOTACILLIDÆ.

- 6. *Anthus bogotensis* Upper Paramo region, Merida.

Fam. MNIOTILTIDÆ.

- 7. *Mniotilta varia* South of Merida.
- 8. *Dendroica blackburniæ* Lower wood-region, Merida.
- 9. — *striata* Merida.
- 10. *Protonotaria citrea* South of Merida.
- 11. *Basileuterus bivittatus* Merida.
- 12. — *nigricristatus* Merida.
- 13. *Setophaga ruticilla* Merida.
- *14. — *albifrons*, sp. n. Upper wood-region, Sierra Nevada.

Fam. CÆREBIDÆ.

- 15. *Diglossa albilateralis* Lower wood-region.
- *16. — *gloriosa*, sp. n. Paramo de la Culata.
- 17. *Conirostrum sitticolor* Paramo de la Culata.

Fam. TANAGRIDÆ.

- 18. *Chlorophonia pretrii* Merida.
- 19. *Euphonia nigricollis* South of Merida.
- 20. *Diva vassori* High wood-region of Merida.
- 21. *Pipridea venezuelensis* Merida.
- 22. *Calliste cayana* Merida.
- 23. — *cyaneicollis* South of Merida.
- 24. *Pæcilothraupis lacrymosa* Merida.
- 25. *Tanagra auricrissa* Merida.
- 26. *Ramphocælus dimidiatus* South of Merida.
- 27. *Nemosia ruficeps* South of Merida.
- 28. *Chlorospingus albitemporalis* Merida, high wood.
- 29. — *xanthophrys* Merida.
- *30. — *ignobilis* Paramo of Merida.
- *31. — *goeringi*, sp. n. Paramo of Merida.

Fam. TROGONIDÆ.

69. *Trogon personatus*..... Merida.
 70. *Pharomacrus antisianus* Merida.
 71. — *auriceps* Merida.

Fam. CAPRIMULGIDÆ.

72. *Stenopsis ruficervix* Merida.
 73. *Hydropsalis lyra* Merida.
 74. *Nyctidromus albicollis* S. of Merida.

Fam. TROCHILIDÆ.

75. *Campylopterus lazulus* Merida.
 *76. *Lafresnaya gayi*..... Merida.
 77. *Acestura heliodori* Merida.
 78. *Oxygogon lindeni* Merida.
 79. *Metallura tyrianthina* Merida.
 80. *Chrysolampis moschitus* Merida.
 81. *Petasophora anais* Merida.
 82. — *cyanotis*..... Merida.
 83. *Bourcieria conradi* Merida.
 84. *Heliangelus spencii* Merida.
 85. *Eriocnemis vestita*..... Paramo of Merida.
 86. *Chrysuronia ænone* Merida.
 87. *Panychlora stenura* (Cab. et Hein.) Merida.

Fam. CUCULIDÆ.

88. *Piaya minuta* Merida.

Fam. RAMPHASTIDÆ.

89. *Aulacorampus albivittis* Merida.

Fam. PICIDÆ.

90. *Chloronerypes rubiginosus* Merida.
 91. *Colaptes rivolii* Paramos of Merida.

Fam. PSITTACIDÆ.

- *92. *Conurus rhodocephalus*, sp. n. Merida.
 *93. *Urochroma dilectissima*, sp. n. S. of Merida.

Fam. STRIGIDÆ.

94. *Syrnium hylophilum* (Temm.) ... Merida.
 95. *Scops brasiliensis* (Gm.) Merida.

Fam. FALCONIDÆ.

96. *Accipiter bicolor* (Vieill.)..... Merida.
 *97. — *ventralis*, ScL. Merida.
 98. *Tinnunculus sparverius*, L. Merida.
 99. *Buteo pterocles* (Temm.) Andes of Merida.

Fam. COLUMBIDÆ.

100. *Zenaida ruficauda*, Bp..... Merida.
 101. *Leptoptila verreauxi*, Bp..... Merida.
 102. *Geotrygon linearis* (Prevost) Upper wood-region of Merida.

Fam. SCOLOPACIDÆ.

103. *Actiturus bartramius* (Wils.) S. of Merida.
 104. *Tringoides macularia* (Vieill.)..... S. of Merida.
 *105. *Gallinago frenata* (Max.)..... S. of Merida, Lagoon of Urao.

Fam. PODICIPITIDÆ.

106. *Podiceps dominicus* (L.) Lagoon of Urao, S. of Merida.

1. **TURDUS ALBIVENTRIS**, Spix; Scl. et Salv. Ex. Orn. p. 147, t. 64.

A young male of this Thrush from Merida. "Iris clear brownish yellow."

2. **TURDUS SERRANUS**, Tsch.; Wieg. Arch. x. pt. 1, p. 280 (1844), et F. P. *Aves*, p. 186.

Merula atrosericea, Lafr. R. Z. 1848, p. 3.

Turdus atrosericeus, Scl. P. Z. S. 1859, pp. 136, 333, et Cat. Am. B. p. 5.

M. Coulon having been kind enough to send us from the Neufchâtel Museum the type specimen of *Turdus serranus* of Tschudi for comparison, we have been enabled to ascertain that this obscure bird is no other than the female or young of the Blackbird hitherto usually called *T. atrosericeus*. Tschudi's type is rather more deeply coloured than a female of the same species in Sclater's collection from Ecuador. There are also some lighter shaft-stripes on the head and wing-coverts, showing indications of immaturity.

The range of this species, therefore, extends over the highlands of Venezuela, Columbia, and Ecuador, into the Sierra region of Peru.

3. **CINCLUS LEUCONOTUS**, Scl. Cat. Am. B. p. 10, t. 2; Salv. Ibis, 1867, p. 122.

The occurrence of this bird in the vicinity of Merida proves a further northern extension of its range than was previously known. Hitherto we have only met with it in Bogotá collections; but DeLattre obtained specimens near Pasto (*cf.* Lafr. R. Z. 1847, p. 68), and Sir William Jardine has an example in his collection which was transmitted to him by Prof. Jameson from the vicinity of Quito.

4. **HELEODYTES GRISEUS**, Sw.

The single specimen of this species differs from the Venezuelan example in Sclater's collection in having the brownish black of the head extending over the upper portion of the back and the wing-feathers. The secondaries and wing-coverts are edged with coffee-brown of the same shade as the lower back, and rather deeper in hue than the corresponding parts of the Venezuelan specimen. Baird (*Rev. Am. B.* p. 96) appears to have described a similar specimen from Bogotá in Mr. Lawrence's collection. The differences are not, in our opinion, of sufficient importance to warrant the separation of this race as a distinct species.

5. HENICORHINA LEUCOPHRYS (Tsch.).

See Salvin's remarks on this species, *anteà*, p. 181.

14. SETOPHAGA ALBIFRONS, sp. nov.

Supra schistacea, alis caudaque nigricantibus: pileo et lateribus capitis nigris, crista verticali cinnamomeo-rubra, plumis nigro terminatis: fronte, loris et regione oculari pure albis: subtus aureo-flava, tectricibus subalaribus et subcaudalibus et rectricibus duabus utrinque externis pro majore parte albis: rostro et pedibus nigris: long. tota 5.5, alæ 2.5, caudæ 2.6 poll. Angl.

Hab. Upper wood-region of Merida (Goering).

Of this distinct species of *Setophaga* Mr. Goering sends us two skins, both obtained in the upper wood-region near Merida. Both are males; but the sexes in this group hardly differ. The iris in one is marked "brown," and in the other "clear brown."

The nearest ally of this new species is *S. ruficoronata* of Kaup, from Ecuador; but in the present bird the front and orbital region are of a pure white instead of a golden yellow.

16. DIGLOSSA GLORIOSA, sp. nov. (Plate XLVI. fig. 1.)

Nigra, uropygio in cinereum trahente, abdomine medio castaneo: tectricibus alarum minoribus et superciliis indistinctis cærulescenti-canis: rostro nigro, pedibus corneis: long. tota 5.2, alæ 2.5, caudæ 2.2.

Hab. Paramo de la Culata, north of Merida (Goering).

Obs. Affinis *D. brunneiventri* ex Peruvia, sed minor et gutture cum pectore superiore nigro differt.

Mr. Goering obtained a single specimen of this distinct new species of *Diglossa* on the Paramo of La Culata, to the north of Merida, where he says it is rare. It is a male, and the iris is marked "dark brown."

30. CHLOROSPINGUS IGNOBILIS.

Sphenops ignobilis, Sclater, P. Z. S. 1861, p. 379, et Cat. p. 160.

Sphenopsis ignobilis, Sclater, Cat. Errata, p. xvi.

Chlorospingus oleagineus, Sclater, P. Z. S. 1862, p. 110.

An accurate examination has satisfied us that Sclater's *Sphenops* (sive *Sphenopsis*) *ignobilis* is founded on a somewhat immature skin of this Tanager. The tail is imperfect, and the bill slightly distorted, which led Sclater to place it among the *Dendrocolaptidæ*!

Mr. Goering sends us one skin of this species from the Paramo of Merida. The iris is marked "clear brown."

31. CHLOROSPINGUS GOERINGI, sp. nov. (Plate XLVI. fig. 2.)

Saturate schistaceus, alis caudaque obscurioribus; pileo et capitibus lateribus nigris, superciliis elongatis albis: subtus castaneus, lateribus et ventre imo fuscioribus: rostro plumbeo nigro, pedibus pallide corylinis: long. tota 6, alæ 2.5, caudæ 2.5, tarsi 1.1.

Hab. Paramos of Merida (*Goering*).

Obs. Affinis *C. castaneicollis*, Sclater, et ejusdem formæ, quamvis robustior, sed dorso schistaceo et superciliis distinctis, necnon gula tota castanea distinguendus.

Mr. Goering obtained a single male specimen of this fine new species near the boundary of the upper wood-region of the Paramos of Merida. The iris is noted as "dark brown." The contents of the stomach were "small fruits." The bird is said to be "very rare."

32. BUARREMON MERIDÆ, sp. nov.

Supra olivaceus, alis caudaque intus fuscis: pileo toto et nucha castaneis: lateribus capitis nigris: vitta mystacali utrinque alba, a gula linea angusta nigra divisa: subtus læte flavus, lateribus et ventre imo in olivaceum trahentibus: rostro nigro, pedibus obscure corylinis: long. tota 6·5, alæ 2·8, caudæ 3·2, tarsi 1.

Hab. Merida (*Goering*).

Obs. Proximus *B. albifrænato*, sed gula flava nec alba, et fronte pileo concolori, nec nigro, diversus.

But one example of this apparently new *Buarremon* is in Mr. Goering's collection, obtained near Merida in July 1869. It is marked "male; iris reddish brown."

34. PHRYGILUS UNICOLOR (Lafr. et D'Orb.).

Phrygillus unicolor et *P. geospizopsis*, Scel. Cat. Am. B. p. 110.

Chlorospiza plumbea, Ph. et Landb. Wieg. Arch. 1864, p. 67.

Mr. Goering sends us a pair of this species from the Paramos of Merida. Upon comparing them with a series of eleven specimens in Sclater's collection from various parts of the highlands of Columbia, Ecuador, Peru, and Bolivia, and also with Chilian specimens obtained in the Cordillera of Santiago and transmitted by Herr Landbäck as typical of *Chlorospiza plumbea*, we are of opinion that these birds are all referable to one species, as Sclater has already hinted (*l. s. c.* and *P. Z. S.* 1857, p. 322).

35. CHRYSOMITRIS XANTHOGASTRA, Du Bus, Bull. Ac. Brux. xxii. pt. 1, p. 152 (1853).

Chrysomitris bryanti, Cassin, Pr. Ac. Sc. Phil. 1865, p. 91; Lawr. Ann. L. N. Y. ix. p. 104.

This Finch was originally described from examples procured near Ocaña in Columbia, not far distant from Merida. We have likewise met with it in Bogotá collections; and in Sclater's cabinet is a skin of the same species obtained by Mr. David Forbes, F.R.S., in Bolivia. Moreover, on comparing it with Costa-Rican examples of *C. bryanti* in Salvin's collection we cannot discover any differences, so that it is evidently a species of wide range, though, apparently, nowhere very common.

38. CYANOCITTA ARMILLATA (G. R. Gray).

Two examples of a *Cyanocitta*, obtained in May 1869 in the

Paramo of Culata, must, we think, be referred to *C. armillata*, a species well known in Bogotá collections.

It is, however, slightly larger than Bogotá skins, and the blue colouring is of a deeper hue, particularly on the upper surface of the tail and wings, which in Bogotá skins have somewhat of a greenish tinge. Mr. Goering notes the legs and bill of this bird as being of a shining black, and the iris as "dark brown."

40. CINCLODES FUSCUS (Vieill.).

Cinclodes fuscus et *C. albidiventris*, Scl. Cat. A. B. p. 149.

After examining Selater's present series of skins of this bird from Ecuador, Peru, Bolivia, and La Plata, and comparing them with a specimen obtained by Mr. Goering from the Paramo of Merida, we have come to the conclusion that they are all referable to one species, which will include Selater's *C. albidiventris*. The La Plata specimens (*C. fuscus* verus) are less rufescent above, and have the tail rather greyer.

49. GRALLARIA GRISEONUCHA, sp. nov.

Supra rufescenti-brunnea, alis intus nigricantibus, loris et nucha lata obscure griseis: colli lateribus et corpore subtus intense ferrugineis, lateribus obscurioribus: cauda brevissima, subcaudalibus abscondita: rostro et pedibus obscure corneis: long. tota 6, alæ 3·5, caudæ 1, tarsi 1·9, rostri a rictu 1.

Hab. Paramo of La Culata, north of Merida (Goering).

Obs. Habitus generalis *G. brevicaudæ*, sed rostro paulo fortiore et crassitie majore: quoad colorem ab omni specie diversa.

Mr. Goering obtained a single specimen of this new *Grallaria* on the Paramo of La Culata in September 1869. It is marked "male, iris clear brown; very rare."

51. OCHTHOËCA SUPERCILIOSA, sp. nov.

Murino-brunnea, alis caudaque nigris: superciliis latis, maculis tetricum majorum alarum terminalibus, et secundariorum marginibus externis cum subalaribus et abdomine toto ferrugineis; reatricis unius utrinque extimæ poyonio externo et crisso albis: rostro et pedibus nigris: long. tota 6, alæ 3·2, caudæ 2·7.

Hab. Paramos of Merida (Goering).

Obs. Proxima *O. fumicolori* ex Columbia, sed superciliis et abdomine ferrugineis dignoscenda.

Two examples of this species are sent by Mr. Goering. Both are females, and were obtained in the Paramos of Merida. The iris in one is marked "clear brown," in the other "brown."

Besides *O. fumicolor*, *O. ænanthoides* (Lafr. et D'Orb.) of Bolivia and *O. polionota* (Scl. et Salv. P. Z. S. 1869, p. 599) of Peru belong to this group of the genus *Ochthoëca*. But both the latter species have the superciliaries white.

53. OCHTHOËCA NIGRITA, sp. nov.

Cinerascenti-nigra, unicolor; superciliis albis: rostro et pedibus nigris: long. tota 5·2, alæ 2·6, caudæ 1·8.

Hab. Merida (Goering).

Obs. Habitus *O. albidiematis* et *O. citrinifrontis*, sed corpore unicolori ab omnibus diversus.

Mr. Goering sends a single skin of this new species, obtained near Merida. It is marked "male; iris brown." The specimen is evidently a bird of the year.

76. LAFRESNAYA GAYI.

Trochilus gayi, Bourc. et Muls. Ann. des Sc. Nat. de Lyon, 1846, p. 325.

Lafresnaya saulæ, Gould, Intr. Troch. p. 70.

A single specimen of this Humming-bird, sent by Mr. Goering from Merida, has the tips of the otherwise white rectrices bronzy green, and not black as in the majority of Ecuadorean examples usually called *L. gayi*. Judging from Mr. Gould's remarks (Mon. Troch. t. 86, et Intr. p. 70), we much doubt if this slight distinction is sufficiently constant to render specific separation justifiable. But should such be the case, the species from Ecuador must bear the name of *L. saulæ*, and the present bird that of *L. gayi*. De-lattre and Bourcier's type of *Trochilus saulæ* (R. Z. 1846, p. 310) was obtained by the former in the environs of Quito. Though no locality is assigned to *L. gayi*, the description is strictly applicable to the present bird.

Out of the thirteen species of Humming-birds collected by Mr. Goering in the vicinity of Merida, it will be observed that no less than five (viz. *Lafresnaya gayi*, *Oxygogon lindeni*, *Bourcieria conradi*, *Heliangelus spencii*, and *Panychlora stenura*) are never met with in the large collections of these birds that are constantly being forwarded from the vicinity of Bogotá. These five species therefore, together with others not yet obtained by Mr. Goering, must be considered peculiar denizens of this branch of the Andean chain; the remainder (eight) of Mr. Goering's species being either of wide range or well-known members of the ordinary avifauna of New Granada, as illustrated by Bogotá collections.

92. CONURUS RHODOCEPHALUS, sp. nov.

Læte viridis: remigibus intus nigricantibus, extus cærulescentibus; pileo roseo-rubro: ventre medio et cauda tota rubiginosorufis: tectricibus subalaribus viridibus: rostro albicante: pedibus obscure corneis: long. tota 9, alæ 5·2, caudæ rectr. med. 4·5, ext. 2·6.

Hab. Vicinity of Merida (Goering).

Of this new *Conurus* Mr. Goering obtained two male specimens near Merida. One of these, described above, appears to indicate a species most nearly allied to *C. roseifrons* (Finsch, Papag. i. p. 534), but differing therefrom in the want of the red rump and brown

throat. The second specimen agrees with the first, except in having the coverts of the primary quill-feathers *white*. This, however, we regard as probably due to incipient albinism, as one of the primaries in the left wing is also partially white, and there are likewise traces of the same colour on the under wing-coverts.

93. *UROCHROMA DILECTISSIMA*, sp. nov. (Plate XLVII.)

Læte viridis, pileo cyanescente: maculis tribus frontilibus et una utrinque postoculari, cum tectricibus alarum externis pro majore parte et campterio toto coccineis: subalaribus flavissimis: gula flavicante: caudæ rectricibus aureis, harum lateralibus viridi limbatis et terminatis; intermediis ad apices nigro late transfasciatis: primariorum tectricibus et remigum omnium superficie superiore nigris, primariis supra viridi extus limbatis, infra fere omnino viridescentibus: rostro flavicante, ad basin plumbeo: pedibus obscure plumbeis: long. tota 6.3, alæ 4.5, caudæ 2, tarsi 0.4.

Hab. South of Merida (Goering).

Mr. Goering has, unfortunately, sent us but one skin of this beautiful new Parrot. It is most nearly allied to *U. hueti*, but distinguishable at once from that and every other member of the genus by the scarlet outer wing-coverts, which remind one of the Crimson-winged Parrot of Australia (*Platycercus erythropterus*). The three frontal spots in this species are likewise peculiar. Mr. Goering notes the iris as "bright brownish yellow."

97. *ACCIPITER VENTRALIS*, Selater, P. Z. S. 1866, p. 303; *Sci.* et *Salv. Ex. Orn.* p. 25, t. 13.

A single adult male example from Merida; agrees with Bogotá skins of *A. ventralis* in Salvin's collection, and is apparently quite distinct from the species obtained by Mr. Goering in his second collection (*cf.* P. Z. S. 1868, p. 632). It is not quite so rufous below as the bird figured in 'Exotic Ornithology.' Mr. Goering notes the irides as yellow.

105. *GALLINAGO FRENATA* (Max.); *Sci.* et *Salv. Ex. Orn.* p. 196.

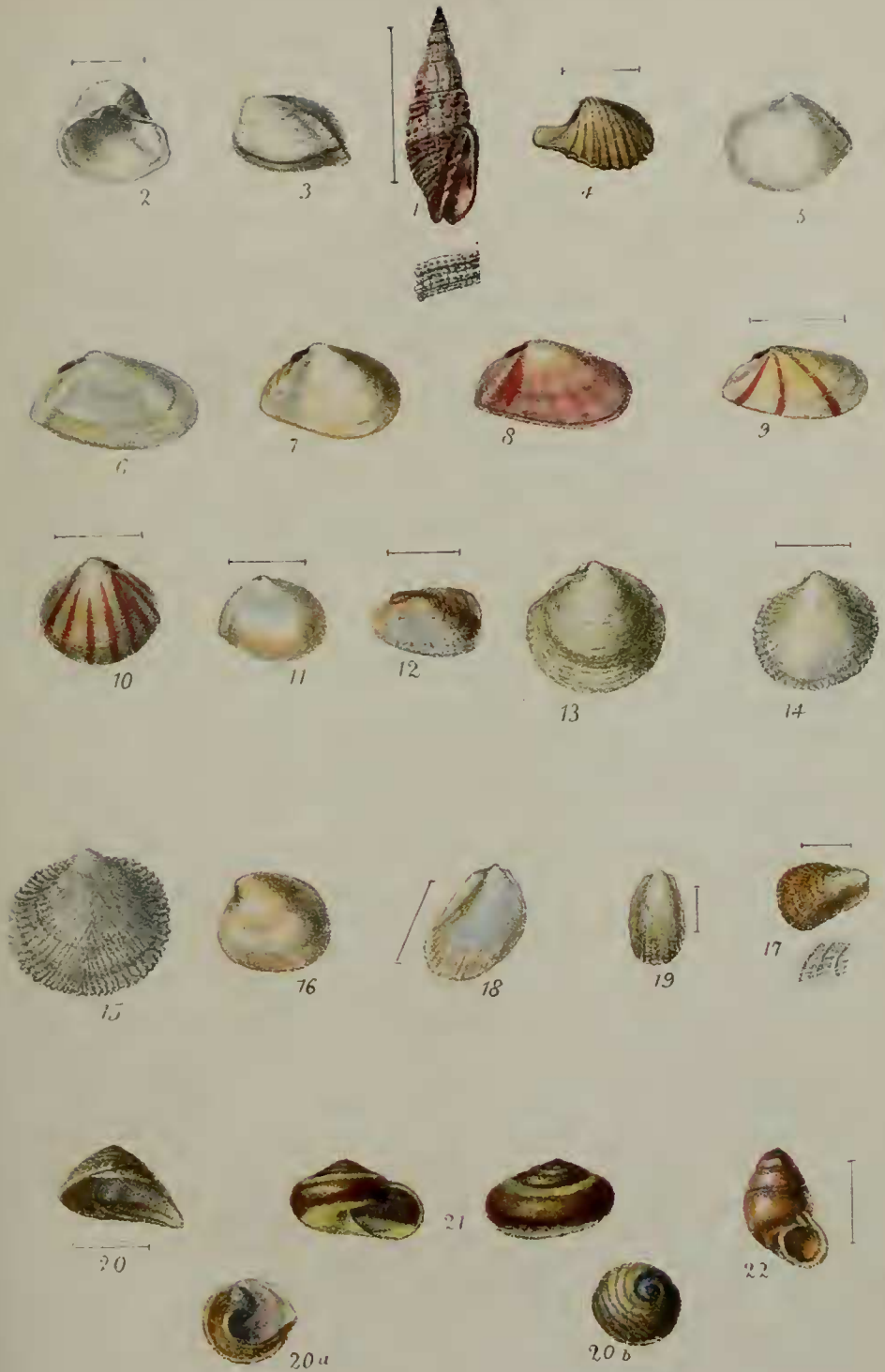
The only Snipe sent by Goering (obtained near the Lagoon of Urao) agrees with Brazilian skins of *G. frenata*.

9. Descriptions of twenty-six new Species of Shells collected by Robert M'Andrew, Esq., in the Red Sea. By HENRY ADAMS, F.L.S.

(Plate XLVIII.)

MITRA (CANCILLA) ANTONIÆ, H. Ad. (Plate XLVIII. fig. 1.)

M. testa subsolida, elongato-fusiformi, costis obtusis, minoribus intervenientibus, et striis longitudinalibus insculpta, albida, fasciis duabus pallide rubris, et super costas punctis fulvo-rubris ornata;



J. B. Sewerby lith

M & N Hannart imp

NEW EXOTIC SHELLS